



*Pm-5*



**marantz®**

*Model Pm-5*

*Stereo Pre Main Amplifier*





## MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, MARANTZ Company has created the ultimate in stereo sound. Only original MARANTZ parts can insure that your MARANTZ product will continue to perform to the specifications for which it is famous.

Parts for your MARANTZ stereo are generally available within 72 hours throughout the nation via a toll-free line to our National Parts Depot in California. The sales professionals who take your call immediately refer to their own desk top computer terminal and can quickly determine the availability and price information you require. If for some reason, your order should exceed our available stock, we usually can instantly provide an alternate replacement part or current delivery information. When the order is placed and confirmed, the computer simultaneously generates "hard copy" orders at the distribution center. As hard copies come directly from the computer to the national parts depot, your requested stock is assembled and prepared for shipment and placed on the first available carrier for delivery to you.

### ORDERING PARTS

Phone orders will eliminate mail delays, and we encourage the use of this method. If you order by mail, use MARANTZ parts order forms which are available from our National Parts Depot located at the following address:

SUPERSCOPE NATIONAL PARTS DEPARTMENT  
20525 Nordhoff Street  
Chatsworth, California 91311  
Phone: 1-800-423-5108  
1-213-998-9333

The following information must be supplied to eliminate delays in processing your order:

1. Complete address.
2. Complete part numbers.
3. Complete description of parts.
4. Model number for which part is required (indicate MARANTZ).
5. Account number (for account customers only).

Direct consumers will be provided with the current retail price quotation on available parts in order to advise them of the cost of the parts and shipping.

### OVERSEAS PARTS ORDERING

Parts may also be ordered from the following overseas addresses:

#### CANADA

Superscope Canada, Ltd.  
3710 Nashua Drive  
Mississauga  
Ontario, Canada L4V1M5

#### AUSTRALIA

Superscope (Australasia) Pty., Ltd.  
32 Cross Street (P.O. Box 604)  
Brookvale 2100 N.S.W.  
Australia

#### JAPAN

Marantz Japan, Inc.  
3622 Kamitsuruma  
Sagamihara Shi  
Kanagawa, Japan

#### EUROPE

Marantz Europe, S.A.  
Avenue Leopold III, 2  
7120 Perennes-Lez-Binche  
Belgium

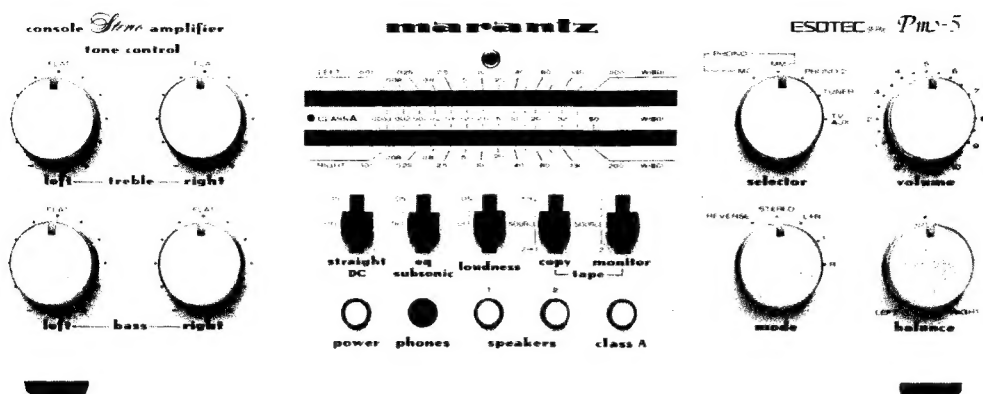
Marantz France  
Rue Louis Armand 9  
92600 Asnieres  
Hauts-de-Seine  
France

Marantz Audio U.K. Ltd.  
London Road, 203  
Staines  
Middlesex  
England

Marantz GmbH  
Max-Planck-Strasse 22  
D-6072 Dreieich 1  
West Germany

All of the above locations are fully equipped to take care of your total service needs. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please contact the nearest facility for the necessary assistance.





## ◇ 特 長

### ■MCヘッドアンプ(7石構成)

初段はNPN超ローノイズトランジスタと、PNP超ローノイズトランジスタを組合わせたものとでプッシュプル構成とし、さらに2段目の増巾段もプッシュプル構成とし、出力段は十分に電流を流したSEPP構成の片チャンネル当り7石のトランジスタを使用した本格的なMCヘッドアンプです。特にS/Nを改善するため、フィードバック回路のインピーダンスを徹底的に小さくしています。定格入力 $220\mu\text{V}$ で、電圧利得は10倍(20dB)となっています。

### ■PHONOアンプ

このPHONOアンプはTIM歪の低減と高S/Nを実現するために、マランツ独特の11石構成の完全全段プッシュプル回路にしています。

初段はNチャンネル、Pチャンネルの超ローノイズ、ハイGmのFETをプッシュプルに組合わせ、さらにカスコードブートストラップ回路を使用し入力段のインピーダンス変化による特性悪化を防止しています。

次段は段間エミッターフォロアーによるバッファアンプを通り、2段目プッシュプル電圧増巾段に入ります。

さらに出力段はどのような負荷にでも十分にドライブすることのできるSEPP回路とし、S/Nを改善するためのイコライザ素子のインピーダンスも従来のものに比べ十分低くし、定格入時のS/Nも86dBを達成しています。

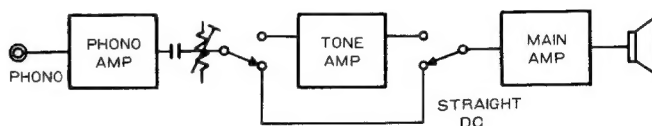
また、イコライザ素子には誤差1%以内の金属被膜抵抗と、2%以内のポリプロピレンコンデンサを使用し、20Hz~20kHz以内でのRIAA偏差を0.2dB以内に抑えています。

さらに、ターンテーブルのゴロやフラッターを取り除くために、出力部にはEQ Subsonicフィルターを入れています。

### ■STRAIGHT DC スイッチ

PHONOアンプの出力を直接メインアンプに送り込むことによって、段間のカップリングコンデンサを1つだけにすることができます。

このスイッチを操作することによってSTRAIGHT DC/TONE INの動作状態を選ぶことができます。なお、各動作でのゲインおよび入力感度の変化はありません。



### ■メインアンプ

STRAIGHT DC動作をさせるために入力感度は150mVで出力80W(8Ω、クラスAB)を得られるゲインを持っています。完全DCアンプとしてはマランツ独特の回路方式を採用し、TIM歪の低減とDCサーボ回路によるDCドリフトの低減に万全を期しています。

#### 電圧増巾段(Voltage Amp)

入力段はペアー特性の良いデュアルFETによるソースフォロアーアンプを使用し、入力段のインピーダンス変化による特性悪化を防いでいます。インピーダンスを下げた信号はデュアルトランジスタによる差動アンプで増巾されますが、この負荷にもまたデュアルトランジスタを使った能動バランス負荷回路を使用しています。

差動出力の片側は位相反転し、それぞれの差動出力は段間エミッターフォロアーによるバッファアンプを通して2段目のプッシュプル増巾段に入ります。



## 電力増巾段(Power Output)

電力増巾段にはリニアリティの優れたパワートランジスタを並列接続した3段ダーリントン方式の出力段になっているため、バイアス電流および出力供給電圧を切換えることにより純クラスA 20W(8Ω)とクラスAB 80W(8Ω)を切換えることができます。

メインアンプとしてはマランツ独特のプッシュプル増巾により、オープンループ特性の改善とマランツ独自の2ポール位相補正回路により高周波領域まで歪の少ない波形伝送とTIM歪の低減を徹底的に進めた回路方式を採用しています。

## ■LED使用による12ポイントピークパワーメーター

高級パワーアンプにふさわしく、出力レベルのチェックができるLEDによるピークパワーメーターを装備しています。このパワーメーターは対数圧縮指示の回路方式を用いているので、小出力から大出力までをレンジ切換なしにモニターすることができます。

## ◇調整方法

### ●バイアス電流調整

- (1)CLASS B (フロントパネルのCLASSⒶのスイッチをOFFにする)

調整個所 RT11、12 (1 KΩ)

入 力 —————

出 力 8 Ω (LOAD)

測定個所 Lch TP1～TP2間、Rch TP4～TP5間にデジタルボルトメーターを接続し端子電圧が安定する(約30秒～1分)まで待ち、その後14mVになるようRH07、RH08を調整します。

- (2)CLASS A (フロントパネルCLASSⒶのスイッチをONにする)

調整個所 RT07、08(4.7 KΩ)

入 力 —————

出 力 8 Ω (LOAD)

測定個所 Lch TP1～TP2間、Rch TP4～TP5間にデジタル、ボルトメーターを接続し端子電圧が安定する(約30秒～1分)まで待ち、その後260mVになるようRT07、RT08を調整します。

### ●ピークパワーメータの調整

調整個所 RX09、RX10(1KΩ)

入 力 AUX

出 力 8 Ω (LOAD)

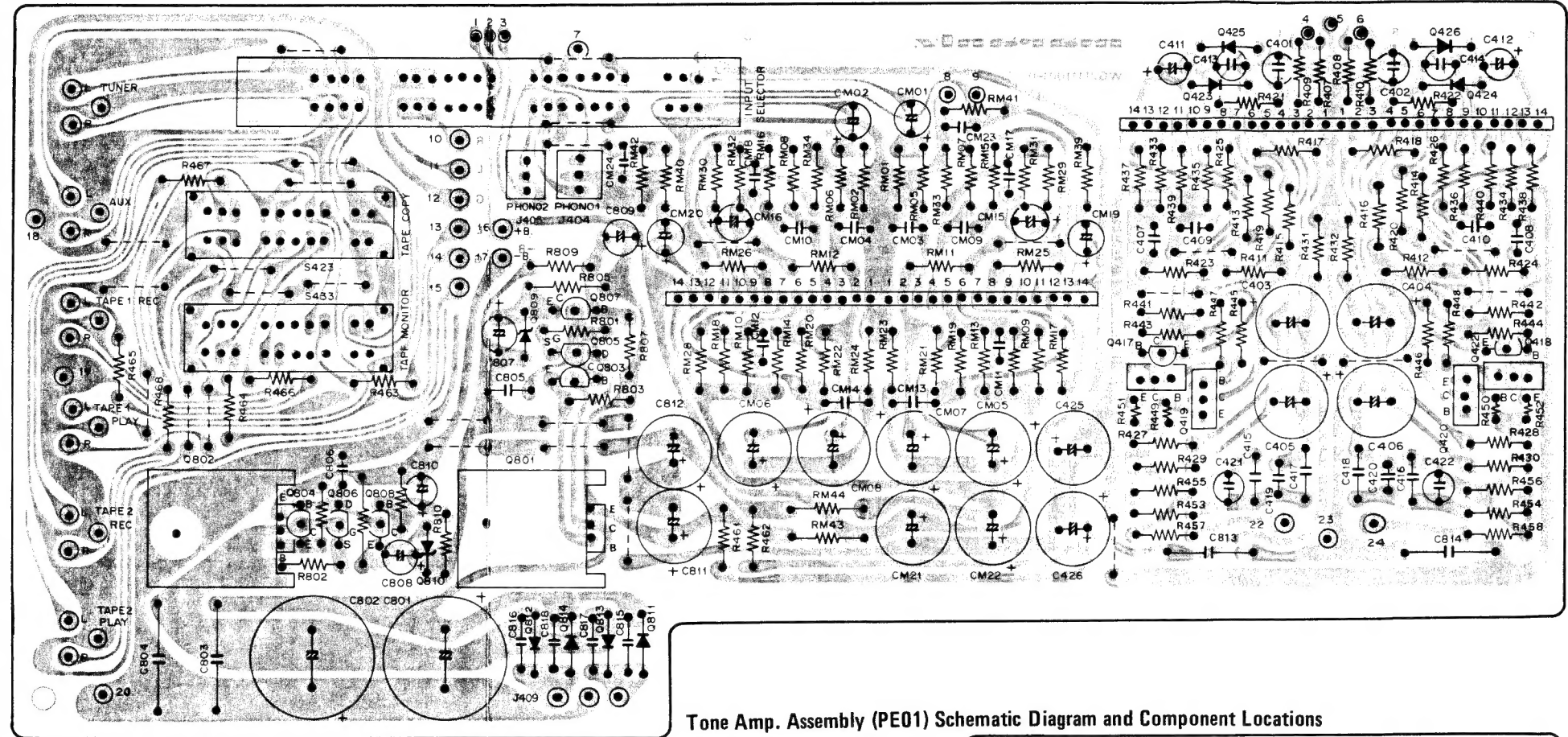
調整方法 8 Ω 負荷50W出力時に40W表示のLEDと80W表示のLEDが両方点灯するようにRX09、RX10を調整する。

## ◇ サービスに必要な測定器

| 項 目                                | 使 用 法                       |
|------------------------------------|-----------------------------|
| 歪 率 計                              | アンプ出力の歪と電圧を測定する。            |
| 低 周 波 発 振 器                        | 正弦波および矩形波の信号源として使用する。       |
| オ ッ シ ロ ス コ ー プ                    | 波形分析およびトラブル・シューティングに使用する。   |
| V T V M                            | 電圧および抵抗値の測定に使用する。           |
| 交 流 ワ ッ ト ・ メ ー タ ー                | アンプの一次側消費電力をモニターする。         |
| 電 源 電 圧 計                          | アンプの一次側電源電圧をモニターする。         |
| ス ラ イ ダ ッ ク<br>(0～140 V A C, 10 A) | アンプの一次側電圧を調節する。             |
| シ ョ ー ト 用 プ ラ グ                    | 雑音を拾わないようにアンプ入力を短絡するのに使用する。 |
| 出 力 負 荷 抵 抗<br>(8Ω±0.5%, 250 W)    | アンプの出力に8Ωの負荷を与える。           |
| 出 力 負 荷 抵 抗<br>(4Ω±0.5%, 250 W)    | アンプの出力に4Ωの負荷を与える。           |



### Pre Amp. Assembly (P400) Schematic Diagram and Component Locations

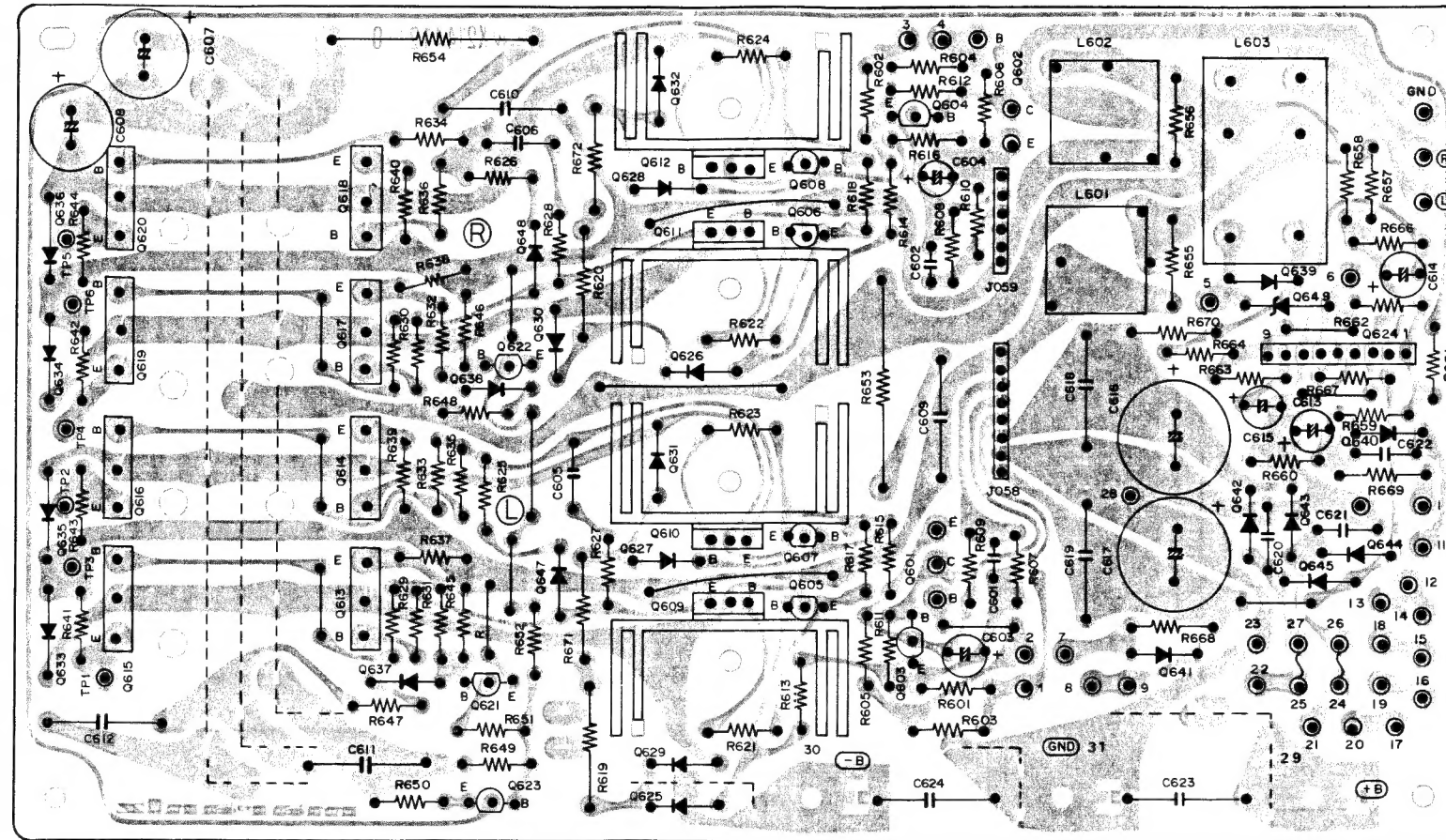
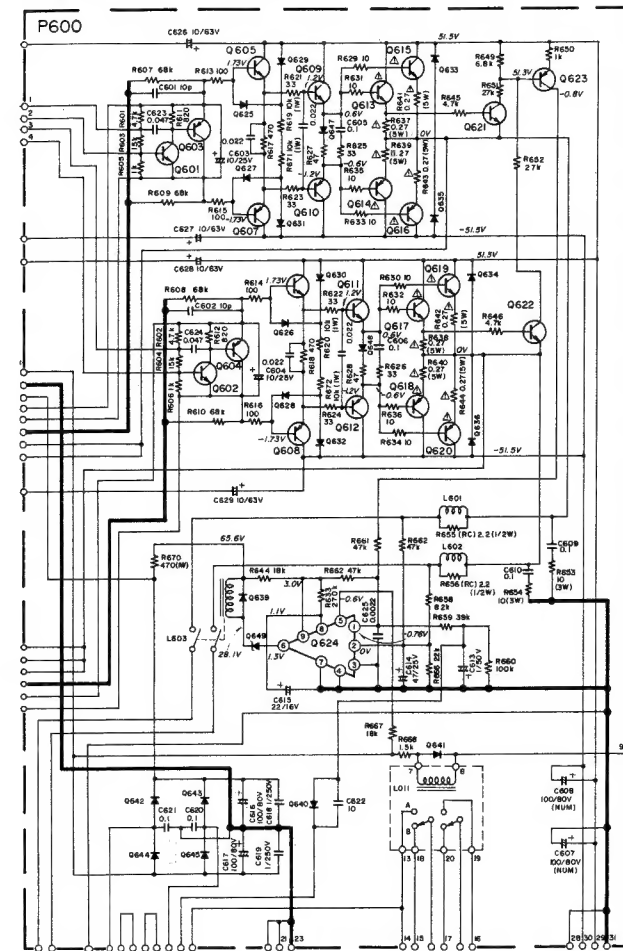


The diagram shows a central stereo unit with several labeled sections: "TUNER", "PHONO", "AMPLIFIER", and "SPEAKERS". The "SPEAKERS" section includes four circular speaker icons labeled 01 through 04. To the left of the main unit are two more speaker icons labeled 06 and 07. Below the main unit are two more speaker icons labeled 08 and 09. Various other components are labeled with numbers: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. The diagram also shows a power source at the bottom left, connected to the main unit via a series of wires.

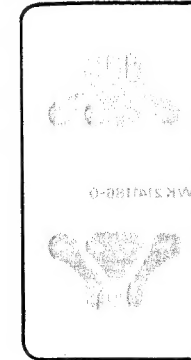
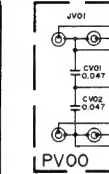
The diagram shows two electronic components, J411 and J410, with their internal structures and pin connections. J411 is on the left and J410 is on the right. Both components have a central vertical line representing a common ground or connection point. J411 has pins 1 through 18, with pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18. J410 has pins 1 through 18, with pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18. The diagram also shows the internal structure of the components, including various resistors and capacitors. The components are labeled J411 and J410. The diagram is a technical drawing showing the internal structure and pin connections of the components. The components are labeled J411 and J410. The diagram is a technical drawing showing the internal structure and pin connections of the components.



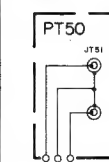
Output Amp. Assembly (P600) Schematic Diagram and Component Locations



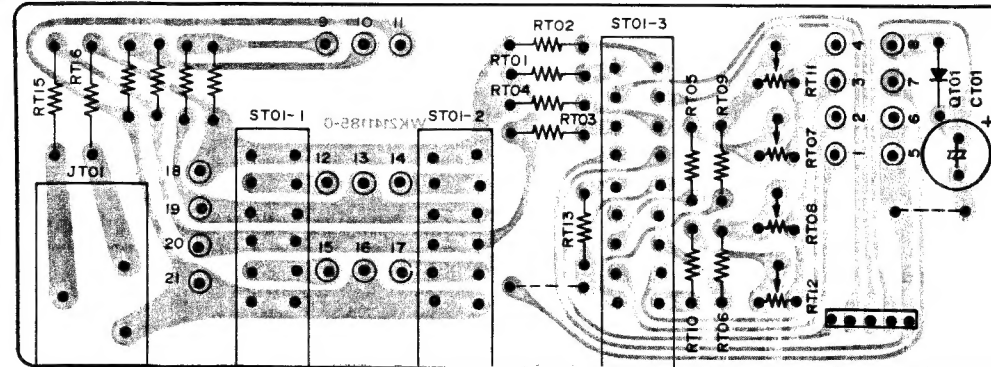
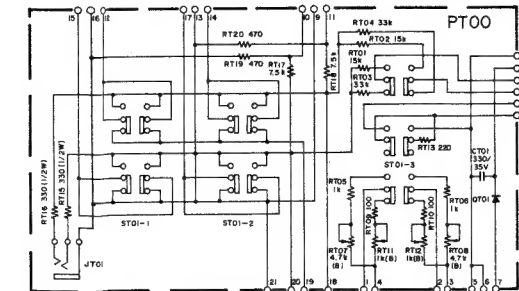
Phono Input Assembly (PV00) Schematic Diagram and Component Locations



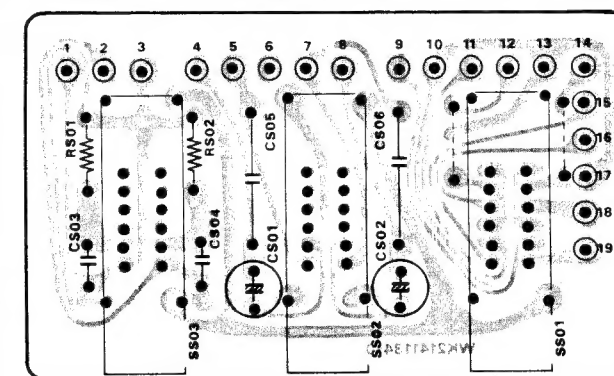
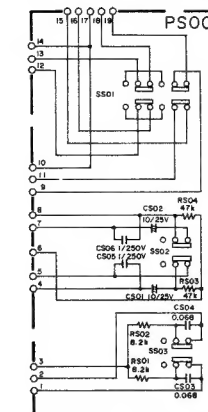
Pre Out Assembly (PT50) Schematic Diagram and Component Locations



Speaker Switch Assembly (PT00) Schematic Diagram and Component Locations

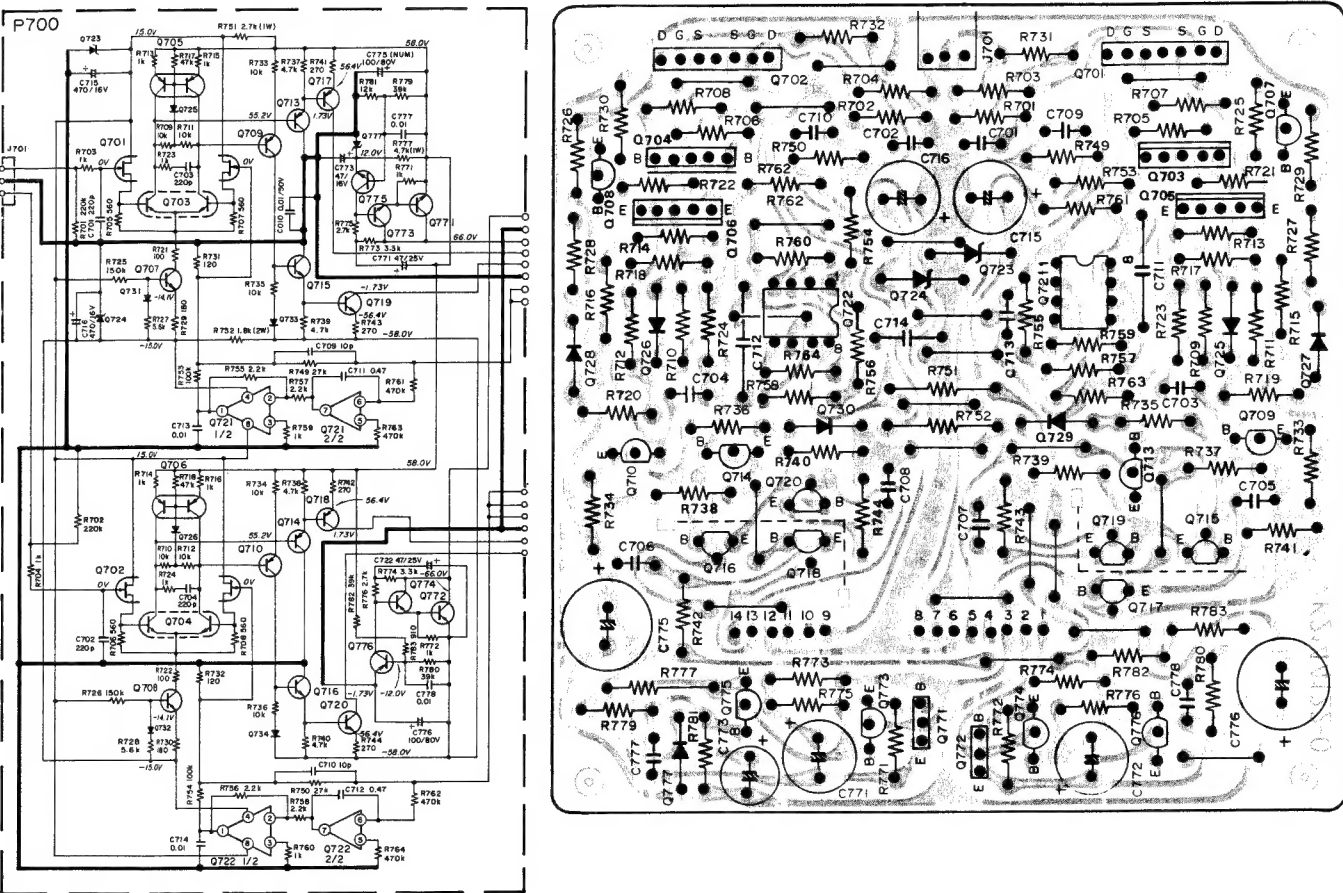


Lever Switch Assembly (PS00) Schematic Diagram and Component Locations

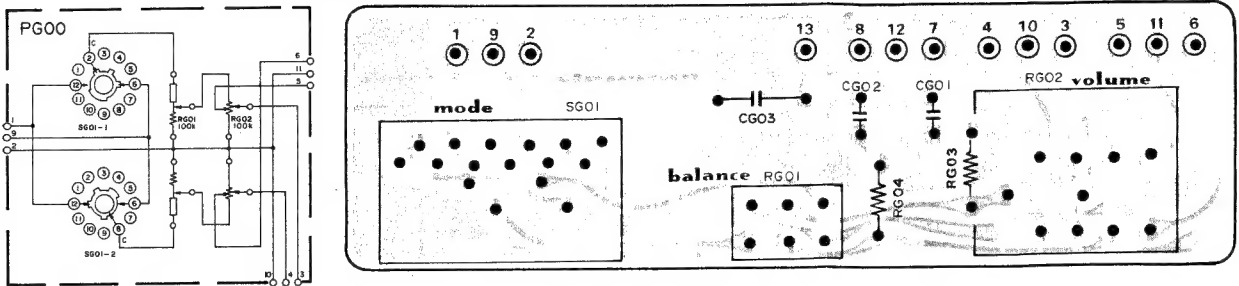




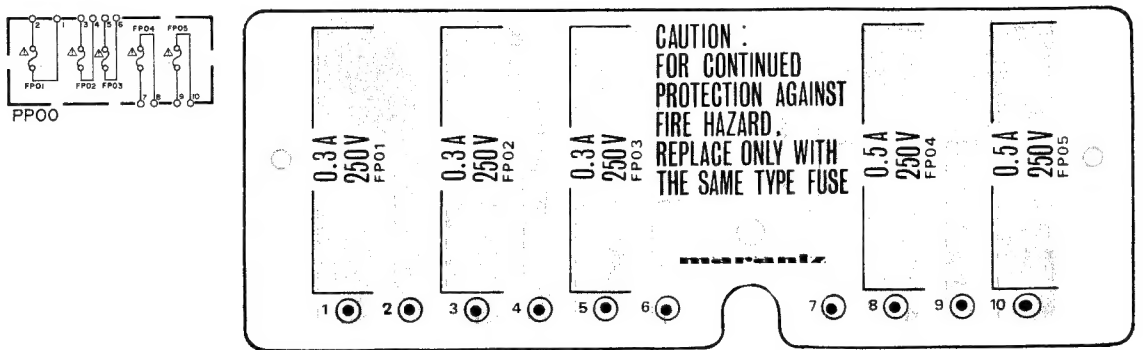
Voltage Amp. Assembly (P700) Schematic Diagram and Component Locations



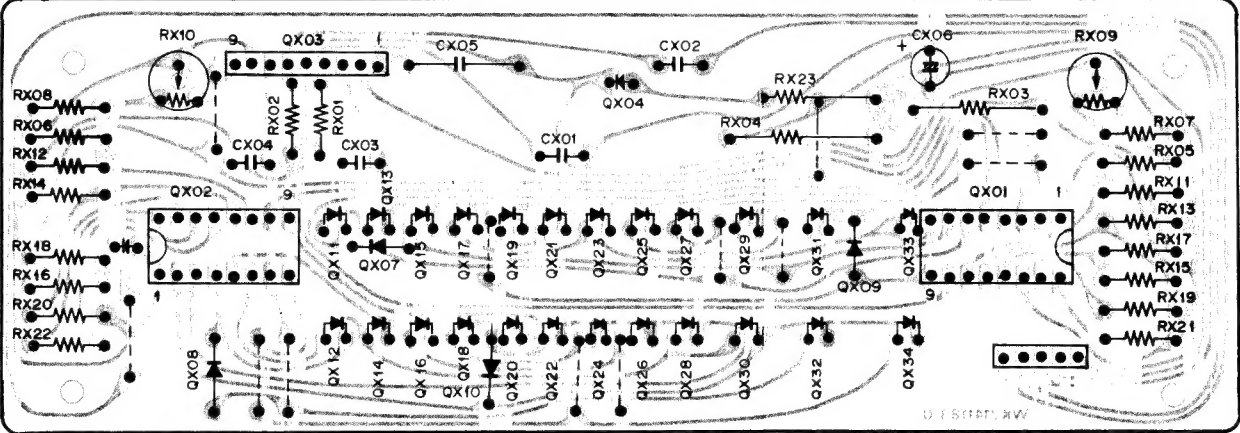
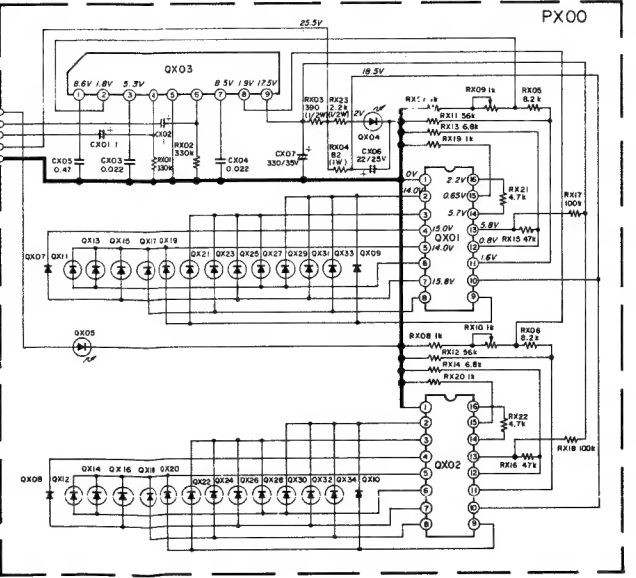
Balance Control Assembly (PG00) Schematic Diagram and Component Locations



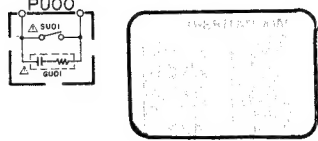
Fuse Assembly (PP00) Schematic Diagram and Component Locations



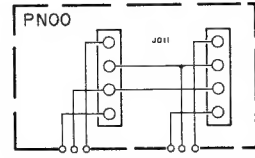
Peak Indicator Assembly (PX00) Schematic Diagram and Component Locations



Power Switch Assembly (PU00) Schematic Diagram and Component Locations

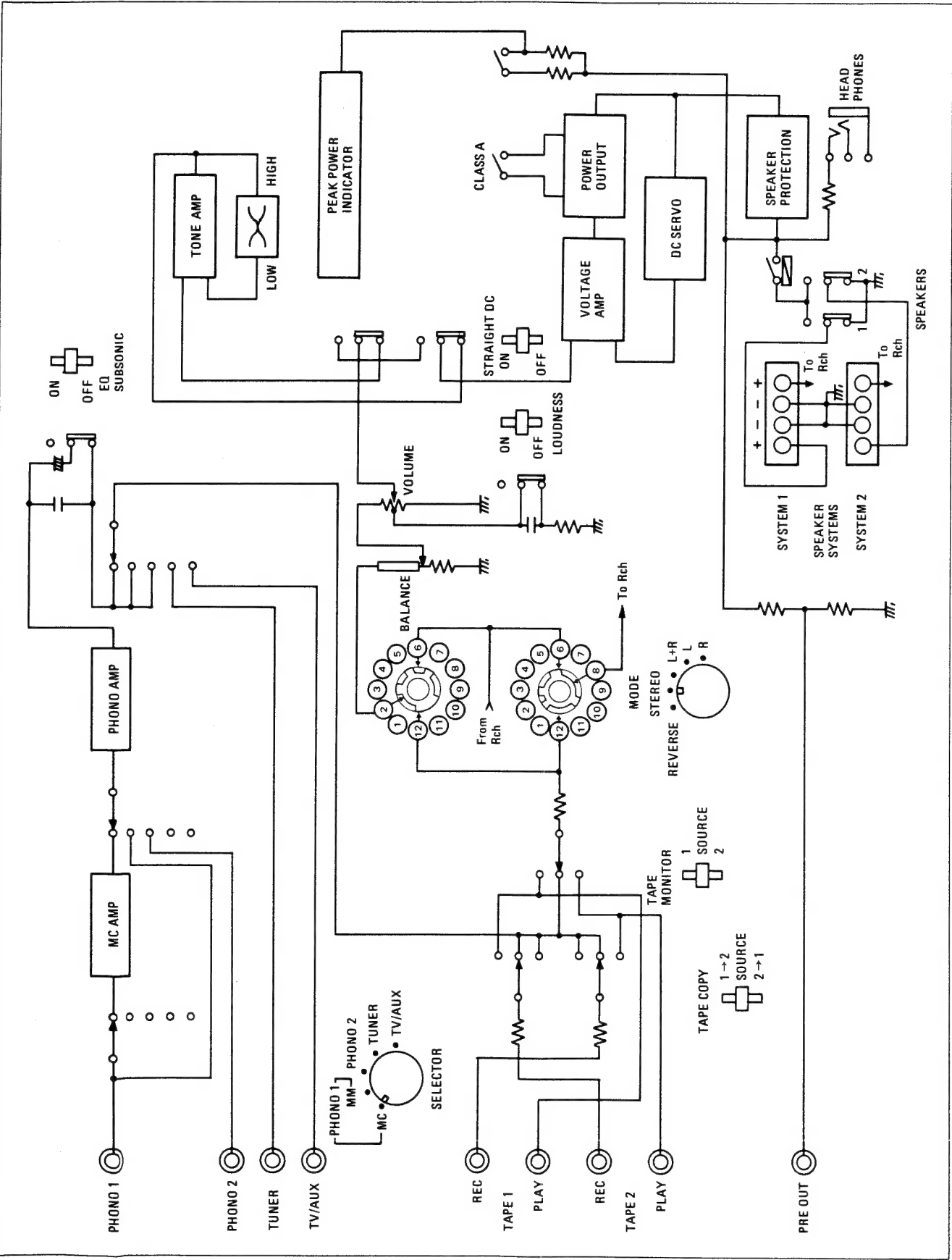


Speaker Terminal Assembly (PN00) Schematic Diagram



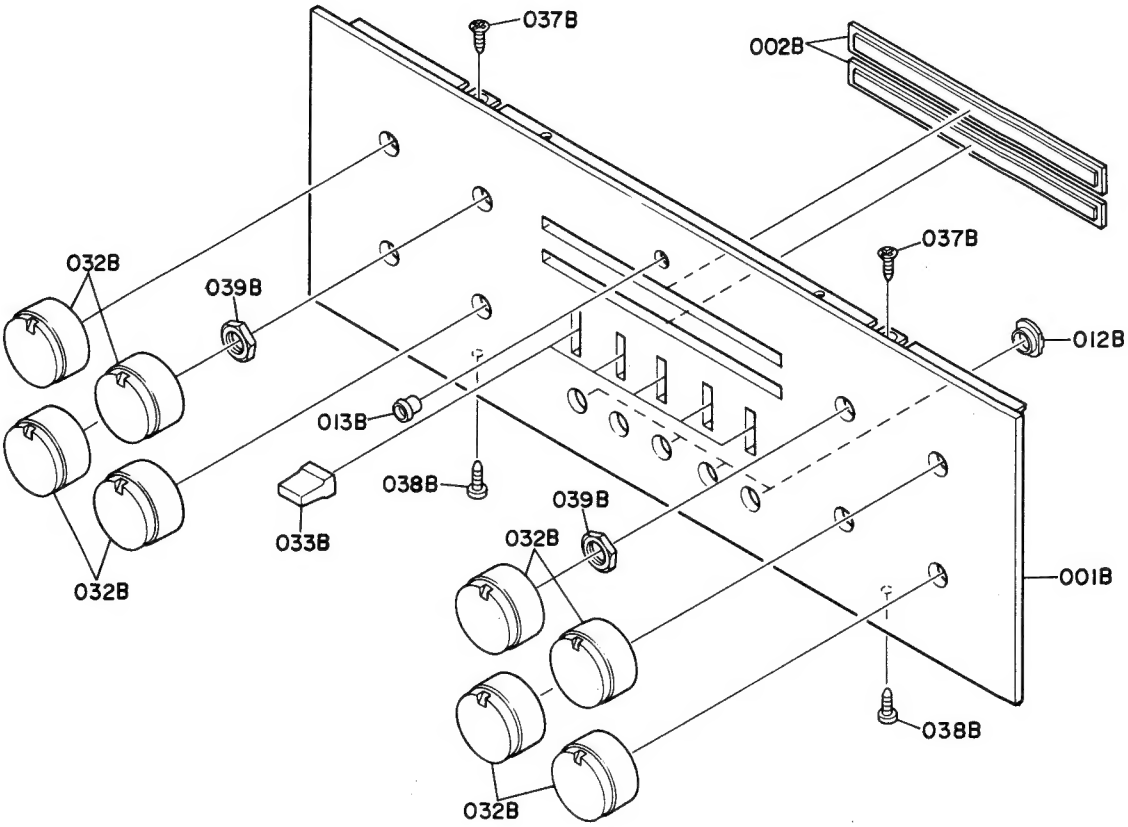


◇ブロックダイアグラム



◇分解及び部品表

● Front Panel (C01-99)



| REF. DESIG. | Q'TY F | PART NO.   | DESCRIPTION             |
|-------------|--------|------------|-------------------------|
| A           | 1      | 2141063400 | Front Panel Assembly    |
| 001B        | 1      | 2141063010 | Escutcheon, Front Panel |
| 002B        | 2      | 2142158010 | Window, Power LED       |
| 012B        | 4      | 2978259010 | Bushing, Push Switch    |
| 013B        | 1      | 2462259010 | Bushing, LED            |

| REF. DESIG. | Q'TY F | PART NO.   | DESCRIPTION              |
|-------------|--------|------------|--------------------------|
| 032B        | 8      | 2462154260 | Knob                     |
| 033B        | 5      | 2144154010 | Knob, Lever Switch       |
| 037B        | 2      | 51340306B0 | F.H. Tapped Screw F3 x 6 |
| 038B        | 2      | 51280308U0 | B.H. Tapped Screw B3 x 8 |
| 039B        | 2      | 53118129G0 | Hexagon Nut              |



Model Pm-5 (F)

Model Pm-5 (E, P)

| REF. DESIG. | Q'TY F | PART NO.   | DESCRIPTION              | REF. DESIG. | Q'TY E P | PART NO.   | DESCRIPTION              |
|-------------|--------|------------|--------------------------|-------------|----------|------------|--------------------------|
| 001D        | 1      | 2416257010 | Lid, Top Cover           | 001D        | 1        | 201H257010 | Lid, Top Cover           |
| 004D        | 4      | 5126030820 | B.H. Tapped Screw B3 x 8 | 004D        | 4        | 51280308U0 | B.H. Tapped Screw B3 x 8 |
| 005D        | 1      | 2144861010 | Label                    | 005D        | 1        | 201H861010 | Label                    |
| 006D        | 4      | 51480406Z9 | F. Washer Screw 4 x 6    | 006D        | 4        | 51100425S9 | B.H.M. Screw 4 x 25      |
|             |        |            |                          | 016D        | 1        | 201H064010 | Case Side Wood L         |
|             |        |            |                          | 017D        | 1        | 201H064020 | Case Side Wood R         |
|             |        |            |                          | 018D        | 4        | 3906259010 | Bushing                  |
|             |        |            |                          | 019D        | 2        | 2140115010 | Spring                   |
|             |        |            |                          | 020D        | 4        | 51543110S0 | F.H. Wood Screw          |
|             |        |            |                          | 021D        | 1        | 2932861010 | Label                    |
|             |        |            |                          | 022D        | 1        | 2578861010 | Label                    |
| 001E        | 1      | 2141160210 | Bracket, Rear Panel      | 001E        | 1        | 2141160230 | Bracket, Rear Panel      |
| 005E        | 1      | 1455259090 | Bushing                  | 001E        | 1        | 2144160220 | Bracket, Rear Panel      |
| 008E        | 1      | 62030029W0 | Lug                      | 005E        | 1        | 1455259040 | Bushing                  |
|             |        |            |                          | 008E        | 1        | 62040029W0 | Lug                      |
|             |        |            |                          | 012E        | 1        | 201H053030 | Cover                    |
|             |        |            |                          | 013E        | 2        | 51280308U0 | B.H. Tapped Screw B3 x 8 |
|             |        |            |                          | 014E        | 2        | 51280308U0 | B.H. Tapped Screw B3 x 8 |
|             |        |            |                          | 056L        | 3        | 62031240W0 | Lug                      |
|             |        |            |                          | 901R        | 1        | 2461861030 | Label                    |
|             |        |            |                          | 902R        | 1        | 2461861030 | Label                    |
|             |        |            |                          | 903R        | 1        | 2461861020 | Label                    |
| 001S        | 1      | 2141801010 | Packing Case             | 001S        | 1        | 2141801040 | Packing Case             |
| 005S        | 1      | 2864804010 | Sleeve                   | 002S        | 1        | 2141801030 | Packing Case             |
| 007S        | 1      | 2141851110 | Instructions             | 007S        | 1        | 2141851310 | Instructions             |
| 010S        | 1      | 9631000110 | Guarantee Card           | 008S        | 2        | 2139809040 | Cushion                  |
| 012S        | 2      | 9526019040 | Serial No. Card          | 012S        | 2        | 9526019060 | Serial No. Card          |
|             |        |            |                          | 012S        | 3        | 9526019050 | Serial No. Card          |
| 013S        | 1      | 2976813020 | Envelope                 | 013S        | 1        | 2713813010 | Envelope                 |
| 014S        | 1      | 2976851040 | Instructions             | 014S        | 1        | 2818854010 | Guarantee Card           |
|             |        |            |                          | 015S        | 1        | 9650000010 | S. Station Card          |
|             |        |            |                          | 016S        | 1        | 2112265010 | Indicator                |
| 018S        | 1      | 9650000030 | S. Station Card          | 018S        | 1        | 2141851020 | Instructions             |
|             |        |            |                          | 019S        | 1        | 2918107310 | Sheet                    |
| 020S        | 1      | 2144807010 | Reinforcing              | 020S        | 1        | 2144807010 | Reinforcing              |
|             |        |            |                          | 020S        | 1        | YJ04000240 | Jack                     |
|             |        |            |                          | 030S        | 1        | 2731821010 | Silicagel                |
|             |        |            |                          | 031S        | 1        | 2141856010 | Circuit Diagram          |
|             |        |            |                          | 032S        | 1        | 2141851020 | Instructions             |
| J416        | 1      | YP01001040 | Plug (3P)                | J416        | 1        | YJ06001240 | Jack                     |
| FP01        | 5      | FS10050080 | Fuse 0.5A 250V           | FP01        | 5        | FS10100090 | Fuse 1A 250V             |
| FP05        | 1      | FS10500060 | Fuse 5A 250V             | FP05        | 1        | FS10500060 | Fuse 2.5A 250V           |
| F001        | 1      | FS10500060 | Fuse 5A 250V             | F001        | 1        | FS10250040 | Fuse 2.5A 250V           |
| GU01        | 1      | BF10400030 | Cap. Comp. 0.1μF +120Ω   | GU01        | 1        | BF10400060 | Cap. Comp.               |
|             |        |            |                          | GU01        | 1        | BF10400020 | Cap. Comp.               |
|             |        |            |                          | J024        | 1        | BY05080010 | 4-Voltage Selector       |
| L001        | 1      | TS60508010 | Power Transformer        | L001        | 1        | TS19614020 | Power Transformer        |
| W001        | 1      | YC02400180 | A.C. Power Cord          | W001        | 1        | YC01900030 | A.C. Power Cord          |
|             |        |            |                          | W001        | 1        | YC02400180 | A.C. Power Cord          |
| C711        | 1      | DF16474510 | Film 0.47μF ±10%         | C711        | 1        | DF16105530 | Film 1μF                 |
| C712        | 1      | DF16474510 | Film 0.47μF ±10%         | C712        | 1        | DF16105530 | Film 1μF                 |
| C771        | 1      | EA47602530 | Elect 47μF 25V           |             |          |            |                          |
| C772        | 1      | EA47602530 | Elect 47μF 25V           |             |          |            |                          |
| C775        | 1      | EA10706390 | Elect 100μF 63V          | C775        | 1        | EA10708050 | Elect 100μF 80V          |
| C776        | 1      | EA10706390 | Elect 100μF 63V          | C776        | 1        | EA10708050 | Elect 100μF 80V          |

Model Pm-5 (F)

Model Pm-5 (E, P)

| REF. DESIG. | Q'TY F | PART NO.   | DESCRIPTION          | REF. DESIG. | Q'TY E P | PART NO.   | DESCRIPTION           |
|-------------|--------|------------|----------------------|-------------|----------|------------|-----------------------|
| R733        | 1      | GD05103140 | 10KΩ 1/4W            | R733        | 1        | GD05472140 | 4.7KΩ 1/4W            |
| R734        | 1      | GD05103140 | 10KΩ 1/4W            | R734        | 1        | GD05472140 | 4.7KΩ 1/4W            |
| R735        | 1      | GD05103140 | 10KΩ 1/4W            | R735        | 1        | GD05472140 | 4.7KΩ 1/4W            |
| R736        | 1      | GD05103140 | 10KΩ 1/4W            | R736        | 1        | GD05472140 | 4.7KΩ 1/4W            |
| R761        | 1      | GD05474140 | 470KΩ 1/4W           | R761        | 1        | GD05334140 | 330KΩ 1/4W            |
| R762        | 1      | GD05474110 | 470KΩ 1/4W           | R762        | 1        | GD05334140 | 330KΩ 1/4W            |
| R763        | 1      | GD05474140 | 470KΩ 1/4W           | R763        | 1        | GD05334140 | 330KΩ 1/4W            |
| R764        | 1      | GD05474140 | 470KΩ 1/4W           | R764        | 1        | GD05334140 | 330KΩ 1/4W            |
| C603        | 1      | EA10602530 | Elect 10μF 25V       | C603        | 1        | EA10703540 | Elect 100μF 35V       |
| C604        | 1      | EA10602530 | Elect 10μF 25V       | C604        | 1        | EA10703540 | Elect 100μF 35V       |
| C616        | 1      | EA22708020 | Elect 220μF 80V      | C616        | 1        | EA22708050 | Elect 220μF 80V       |
| C617        | 1      | EA22708020 | Elect 220μF 80V      | C617        | 1        | EA22708050 | Elect 220μF 80V       |
|             |        |            |                      | C618        | 1        | DF16105530 | Film 1μF              |
|             |        |            |                      | C619        | 1        | DF16105530 | Film 1μF              |
|             |        |            |                      | C623        | 1        | DF16473350 | Film 0.047μF 50V      |
|             |        |            |                      | C624        | 1        | DF16473350 | Film 0.047μF 50V      |
|             |        |            |                      | L602        | 1        | LJ28115090 | Coil                  |
| R617        | 1      | GG05102140 | 1KΩ 1/4W             | R617        | 1        | GG05471140 | 470Ω 1/4W             |
| R618        | 1      | GG05102140 | 1KΩ 1/4W             | R618        | 1        | GG05471140 | 470Ω 1/4W             |
| CX06        | 1      | EA10702530 | Elect 100μF 25V      | CX06        | 1        | EA22602530 | Elect 22μF 25V        |
|             |        |            |                      | CX07        | 1        | EA33702530 | Elect 330μF 25V       |
| RX04        | 1      | GA05101010 | 100Ω 1W              | RX04        | 1        | GA05820010 | 82Ω 1W                |
| CM19        | 1      | EA22602590 | Elect 22μF 25V       | CM19        | 1        | EQ22602520 | Elect 22μF 25V        |
| CM20        | 1      | EA22602590 | Elect 22μF 25V       | CM20        | 1        | EQ22602520 | Elect 22μF 25V        |
| CM21        | 1      | EA47701690 | Elect 470μF 16V      | CM21        | 1        | EA47702530 | Elect 470μF 25V       |
| CM22        | 1      | EA47701690 | Elect 470μF 16V      | CM22        | 1        | EA47702530 | Elect 470μF 25V       |
| C411        | 1      | EA10602530 | Elect 10μF 25V       | C411        | 1        | DF17152300 | Film 1500pF 50V       |
| C412        | 1      | EA10602530 | Elect 10μF 25V       | C412        | 1        | DF17152300 | Film 1500pF 50V       |
| C421        | 1      | DF64322010 | Film 3200pF ±2%      | C421        | 1        | DF65322010 | Film 3200pF           |
| C422        | 1      | DF64322010 | Film 3200pF ±2%      | C422        | 1        | DF65322010 | Film 3200pF           |
|             |        |            |                      | C431        | 1        | DF55681090 | Film 680pF 50V        |
|             |        |            |                      | C432        | 1        | DF55681090 | Film 680pF 50V        |
| CT01        | 1      | EA33703530 | Elect 330μF 35V      | CT01        | 1        | EA10803530 | Elect 1000μF 35V      |
| JT01        | 1      | YJ01001340 | Jack, Headphone      | JT01        | 1        | YJ01001400 | Jack, Headphone       |
| QT01        | 1      | HD20015030 | Diode DS135-D        | QT01        | 1        | HD20025100 | Diode 10DF-21A        |
| CE01        | 1      | EA47503530 | Elect 4.7μF 35V      | CE01        | 1        | EA10505030 | Elect 1μF 50V         |
| CE02        | 1      | EA47503530 | Elect 4.7μF 35V      | CE02        | 1        | EA10505030 | Elect 1μF 50V         |
| CE05        | 1      | EA47601030 | Elect 47μF 10V       | CE05        | 1        | EA22701030 | Elect 220μF 10V       |
| CE06        | 1      | EA47601030 | Elect 47μF 10V       | CE06        | 1        | EA22701030 | Elect 220μF 10V       |
| CE21        | 1      | EA47503530 | Elect 4.7μF 10V      | CE21        | 1        | EA33505030 | Elect 3.3μF 50V       |
| CE22        | 1      | EA47503530 | Elect 4.7μF 10V      | CE22        | 1        | EA33505030 | Elect 3.3μF 50V       |
|             |        |            |                      | CE27        | 1        | DF17472300 | Film 4700pF 50V       |
|             |        |            |                      | CE28        | 1        | DF17472300 | Film 4700pF 50V       |
|             |        |            |                      | CE29        | 1        | DF55221090 | Film 220pF 50V        |
|             |        |            |                      | CE30        | 1        | DF55221090 | Film 220pF 50V        |
| RE07        | 1      | GD05331140 | 330Ω 1/4W            | RE07        | 1        | GD05333140 | 33KΩ 1/4W             |
| RE08        | 1      | GD05331140 | 330Ω 1/4W            | RE08        | 1        | GD05333140 | 33KΩ 1/4W             |
| CV01        | 1      | DK18473320 | Ceramic Cap. 0.047μF | CV01        | 1        | DK18473310 | Ceramic Cap. 0.047μF  |
| CV02        | 1      | DK18473320 | Ceramic Cap. 0.047μF | CV02        | 1        | DK18473310 | Ceramic Cap. 0.047μF  |
| C003        | 1      | DF17104520 | Film Cap. 0.1μF 200V | C003        | 1        | DF17103510 | Film Cap. 0.01μF 200V |
| C004        | 1      | DF17104520 | Film Cap. 0.1μF 200V | C004        | 1        | DF17103510 | Film Cap. 0.01μF 200V |
| C005        | 1      | DF17104520 | Film Cap. 0.1μF 200V | C005        | 1        | DF17103510 | Film Cap. 0.01μF 200V |
| C006        | 1      | DF17104520 | Film Cap. 0.1μF 200V | C006        | 1        | DF17103510 | Film Cap. 0.01μF 200V |
|             |        |            |                      | C007        | 1        | DK18473320 | Ceramic Cap. 0.047μF  |
|             |        |            |                      | C008        | 1        | DK18473320 | Ceramic Cap. 0.047μF  |



## Model Pm-5 (F)

## Model Pm-5 (E, P)

| REF.<br>DESIG. | Q'TY | PART NO.   | DESCRIPTION         | REF.<br>DESIG. | Q'TY |   | PART NO.   | DESCRIPTION              |
|----------------|------|------------|---------------------|----------------|------|---|------------|--------------------------|
|                | F    |            |                     |                | E    | P |            |                          |
|                |      |            |                     | C009           | 1    | 1 | DK18473320 | Ceramic Cap. 0.047μF     |
|                |      |            |                     | C017           | 1    | 1 | EA10708050 | Elect 100μF 80V          |
|                |      |            |                     | C018           | 1    | 1 | EA10708050 | Elect 100μF 80V          |
| C626           | 1    | EA10606390 | Elect Cap. 10μF 63V |                |      |   |            |                          |
| C627           | 1    | EA10606390 | Elect Cap. 10μF 63V |                |      |   |            |                          |
| C628           | 1    | EA10606390 | Elect Cap. 10μF 63V |                |      |   |            |                          |
| C629           | 1    | EA10606390 | Elect Cap. 10μF 63V |                |      |   |            |                          |
|                |      |            |                     | C635           | 1    | 1 | EA10606390 | Elect Cap. 10μF 63V      |
|                |      |            |                     | C636           | 1    | 1 | EA10606390 | Elect Cap. 10μF 63V      |
|                |      |            |                     | C637           | 1    | 1 | EA10606390 | Elect Cap. 10μF 63V      |
|                |      |            |                     | C638           | 1    | 1 | EA10606390 | Elect Cap. 10μF 63V      |
|                |      |            |                     | C661           | 1    | 1 | DF16223300 | Film Cap. 0.022μF 50V    |
|                |      |            |                     | C662           | 1    | 1 | DF16223300 | Film Cap. 0.022μF 50V    |
|                |      |            |                     | C663           | 1    | 1 | DF16223300 | Film Cap. 0.022μF 50V    |
|                |      |            |                     | C664           | 1    | 1 | DF16223300 | Film Cap. 0.022μF 50V    |
|                |      |            |                     | P400           | 1    |   | WG21410010 | P.W. Board, Pre Amp      |
|                |      |            |                     |                | 1    |   | ZZ21418040 | P.W. Board Assembly      |
|                |      |            |                     | P401           | 1    |   | WH21441330 | P.W. Board, MM TR        |
|                |      |            |                     |                | 1    |   | ZZ21441330 | P.W. Board Assembly      |
|                |      |            |                     | P600           | 1    |   | WK21441210 | P.W. Board, Output Amp   |
|                |      |            |                     |                | 1    |   | ZZ21441210 | P.W. Board Assembly      |
|                |      |            |                     | P700           | 1    |   | WK21441220 | P.W. Board, Voltage Amp  |
|                |      |            |                     |                | 1    |   | ZZ21441220 | P.W. Board Assembly      |
|                |      |            |                     | PE01           | 1    |   | WK21411810 | P.W. Board, Tone Amp (L) |
|                |      |            |                     |                | 1    |   | ZZ21411810 | P.W. Board Assembly      |
|                |      |            |                     | PE02           | 1    |   | WK21411820 | P.W. Board, Tone Amp (R) |
|                |      |            |                     |                | 1    |   | ZZ21411820 | P.W. Board Assembly      |
|                |      |            |                     | PG00           | 1    |   | WH21441310 | P.W. Board, Mode Balance |
|                |      |            |                     |                | 1    |   | ZZ21441310 | P.W. Board Assembly      |
|                |      |            |                     | PM01           | 1    |   | WK21441320 | P.W. Board, MC TR.       |
|                |      |            |                     |                | 1    |   | ZZ21441320 | P.W. Board Assembly      |
|                |      |            |                     | PP00           | 1    |   | WF21440010 | P.W. Board, Fuse         |
|                |      |            |                     |                | 1    |   | ZZ21440010 | P.W. Board Assembly      |
|                |      |            |                     | PS00           | 1    |   | WK21411840 | P.W. Board, Lever SW     |
|                |      |            |                     |                | 1    |   | ZZ21411840 | P.W. Board Assembly      |
|                |      |            |                     | PT00           | 1    |   | WK21411850 | P.W. Board, SPK SW       |
|                |      |            |                     |                | 1    |   | ZZ21411850 | P.W. Board Assembly      |
|                |      |            |                     | PU00           | 1    |   | WK21411880 | P.W. Board, Power SW     |
|                |      |            |                     |                | 1    |   | ZZ21418880 | P.W. Board Assembly      |
|                |      |            |                     | PV00           | 1    |   | WK21411860 | P.W. Board, Phono Input  |
|                |      |            |                     |                | 1    |   | ZZ21411860 | P.W. Board Assembly      |
|                |      |            |                     | PX00           | 1    |   | WK21411830 | P.W. Board, Peak Ind.    |
|                |      |            |                     |                | 1    |   | ZZ21411830 | P.W. Board Assembly      |

## TECHNICAL SPECIFICATIONS

## AUDIO SECTION

|  |   |
|--|---|
| Rated Power Output (20 Hz to 20 kHz, both channels driven) | 80W x 2 (8Ω Load) Class AB<br>20W x 2 (4Ω Load) Class A |
|--|---|

|  |                |
|--|----------------|
| Power Bandwidth (8Ω Load, THD 0.05%) ..... | 5 Hz to 90 kHz |
|--|----------------|

|  |        |
|--|--------|
| THD (20 Hz to 20 kHz, 8Ω Load) . . . . . | 0.015% |
|--|--------|

|                           |        |
|---------------------------|--------|
| I.M. Distortion . . . . . | 0.015% |
|---------------------------|--------|

|                                      |                 |
|--------------------------------------|-----------------|
| Frequency Response (20 Hz to 20 kHz) | +0, -0.2 dB     |
| (+1, -1 dB)                          | 5 Hz to 100 kHz |

Damping Factor (8 ohms Load) . . . . . 100

Input Sensitivity and Impedance (at MAIN IN)

|                    |                      |
|--------------------|----------------------|
| Phono 1 (MM) ..... | 2.2 mV/47 k $\Omega$ |
|--------------------|----------------------|

Phono 1 (MC) ..... 220  $\mu$ V/75 $\Omega$ 

|                    |                      |
|--------------------|----------------------|
| Phono 2 (MM) ..... | 2.2 mV/47 k $\Omega$ |
|--------------------|----------------------|

High Level . . . . . 150 mV/40 k $\Omega$

Frequency Response, RIAA 20 Hz to 20 kHz . . . . .  $\pm 0.2$  dB

Equivalent Input Noise (Phono, IHF-A) . . . . . 0.24  $\mu$ V

### Signal-to-Noise Ratio (IHF-A Network)

Phono (MM) ..... 86 dB

Phono (MC) ..... 68 dB

TAPE/TUNER/AUX . . . . . 110 dB

Phono MAX Input Voltage, 1 kHz

Phono (MM) ..... 220 mV

Phono (MC) ..... 20 mV

### Tone Control Response

Bass Range 100 Hz .....  $\pm 8$  dB

TREBLE Range 10 kHz .....  $\pm 8$  dB

## GENERAL

|                              |                                |
|------------------------------|--------------------------------|
| Power Requirements . . . . . | 110/120/220/240 V AC, 50/60 Hz |
|------------------------------|--------------------------------|

|                             |       |
|-----------------------------|-------|
| Power Consumption . . . . . | 200 W |
|-----------------------------|-------|

### Dimensions

Panel Width . . . . . 16-3/8" (416 mm)

Panel Height ..... 5-3/4" (146 mm)

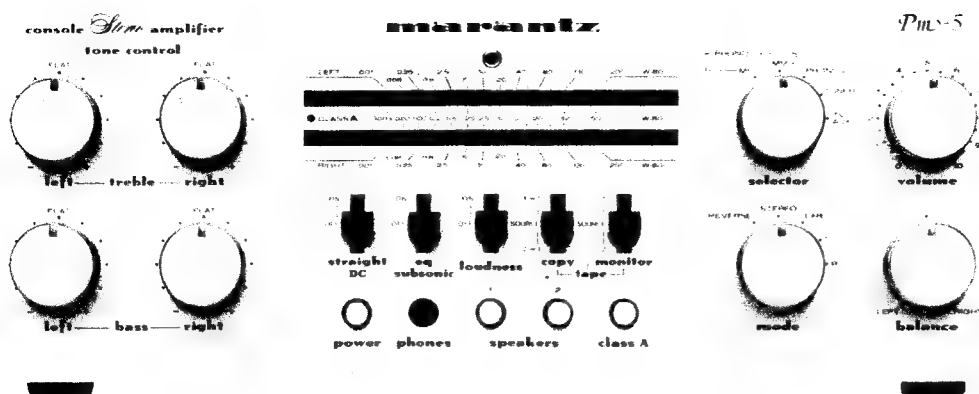
Depth ..... 13-1/16" (332 mm)

Weight

Unit alone ..... 28 lbs 6 oz (13 kg)



## MARANTZ MODEL Pm-5 STEREO PRE MAIN AMPLIFIER



### FEATURES

- **MC HEAD amplifier**

The first stage uses super-low noise NPN and PNP transistors in a push-pull circuit. The second stage is also a push-pull circuit. The output stage is a high gain SEPP amplifier with 7 transistors per channel. The feedback circuit has a very low impedance, thus improving the S/N. With this design, this MC head amplifier provides a high voltage gain (20 dB) at its rated input of 220  $\mu$ V.

- **PHONO amplifier**

The PHONO amplifier is a unique Marantz full-stage push-pull circuit using 11 transistors that ensures low TIM distortion and high S/N. The first stage uses super-low noise, high Gm FETs in push-pull connection (N and P channels) and a cascode boost trap circuit to prevent the deterioration of characteristics due to changes in input impedance.

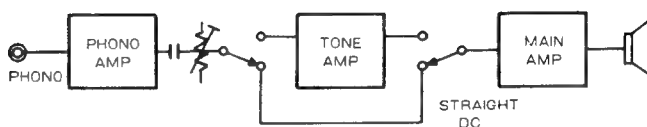
The PHONO signal is fed through the emitter follower buffer amplifier to the push-pull voltage amplifier in the second stage.

The output stage is an SEPP circuit having sufficient driving ability. The equalizer circuit has a very low impedance so that the S/N is a high 86 dB at the rated input. This circuit uses high quality metallic film resistors ( $\pm 1\%$ ) and polypropylene capacitors ( $\pm 2\%$ ) to reduce the deviation from the RIAA characteristic to less than 0.2 dB in the range 20 Hz ~ 20 kHz.

The output stage also includes an EQ subsonic filter to eliminate wow and flutter generated by the turntable.

- **Straight DC switch**

By using this switch, the output of the PHONO amplifier, passing through the coupling capacitor, is fed directly to the main amplifier without affecting the gain and input sensitivity, so the main amplifier operates in the STRAIGHT DC/TONE IN mode.



- **Main amplifier**

The main amplifier has a sufficient gain to provide 80 W (class AB, 8 ohms) of output power at 150 mV input to ensure satisfactory STRAIGHT DC operation. This full-stage DC amplifier employs a unique Marantz circuit design to minimize TIM distortion and a DC servo circuit to eliminate DC drift.

#### Voltage amplifier stage

The input stage uses a matched pair of dual FETs as a source follower amplifier to prevent the deterioration of the characteristics due to changes in input impedance. The low impedance signal is amplified by the dual transistor differential amplifier which forms an active load balancing circuit. The differential output is fed through the emitter follower buffer amplifier to the push-pull amplifier in the next stage.

#### Power amplifier stage

The power amplifier stage uses high linearity power transistors which are connected in parallel to form a 3-stage Darlington circuit.

By selecting the bias current and output voltage, the power output stage can be switched between pure class A amplification, 20W (8 ohms) and class AB amplification, 80W (8 ohms).

The use of unique Marantz push-pull and 2-pole phase compensating circuits provides excellent open-loop characteristics and distortion-free output.



- **12-point LED peak power meter**

LED peak power meters are used to indicate the output levels of the left and right channels.

The use of a logarithmic compression circuit allows monitoring of low and high output levels without the need for a level selector.

- **PLUS**

The speaker protection circuit uses high performance ICs and relays. The power supply circuit incorporates a large sized, high regulation transformer and large capacity electrolytic audio capacitors.

The power output circuit is equipped with high efficiency heat sinks to cool the power transistors, thus providing continuous high output power.

## ADJUSTMENT

- **Bias current adjustment**

1. Class B (Set the front panel CLASS A button to the OFF position.)

Adjustments: RT11 and RT12 (1 k $\Omega$ )

Input:

Output: 8-ohm load

Procedure: Connect a digital voltmeter across TP1 and TP2 (L ch.) and across TP4 and TP5 (R ch.). After the terminal voltages stabilize (30 ~ 60 seconds later), adjust RT11 and RT12 until the voltmeter reads 14 mV for each channel.

2. Class A (Press the front panel Class A button to the ON position.)

Adjustments: RT07 and RT08 (4.7 k $\Omega$ )

Input:

Output: 8-ohm load

Procedure: Connect a digital voltmeter across TP1 and TP2 (L ch.) and across TP4 and TP5 (R ch.). After the terminal voltages stabilize (30 ~ 60 seconds later), adjust RT07 and RT08 until the voltmeter reads 260 mV for each channel.

- **Peak power meter adjustment**

Adjustments: RX09 and RX10 (1 k $\Omega$ )

Input: AUX

Output: 8 $\Omega$  load

Procedure: Adjust RX09 and RX10 so both the 40 W and 80 W indicator LED's go on when the unit is delivering 50 watt output into 8  $\Omega$  load.

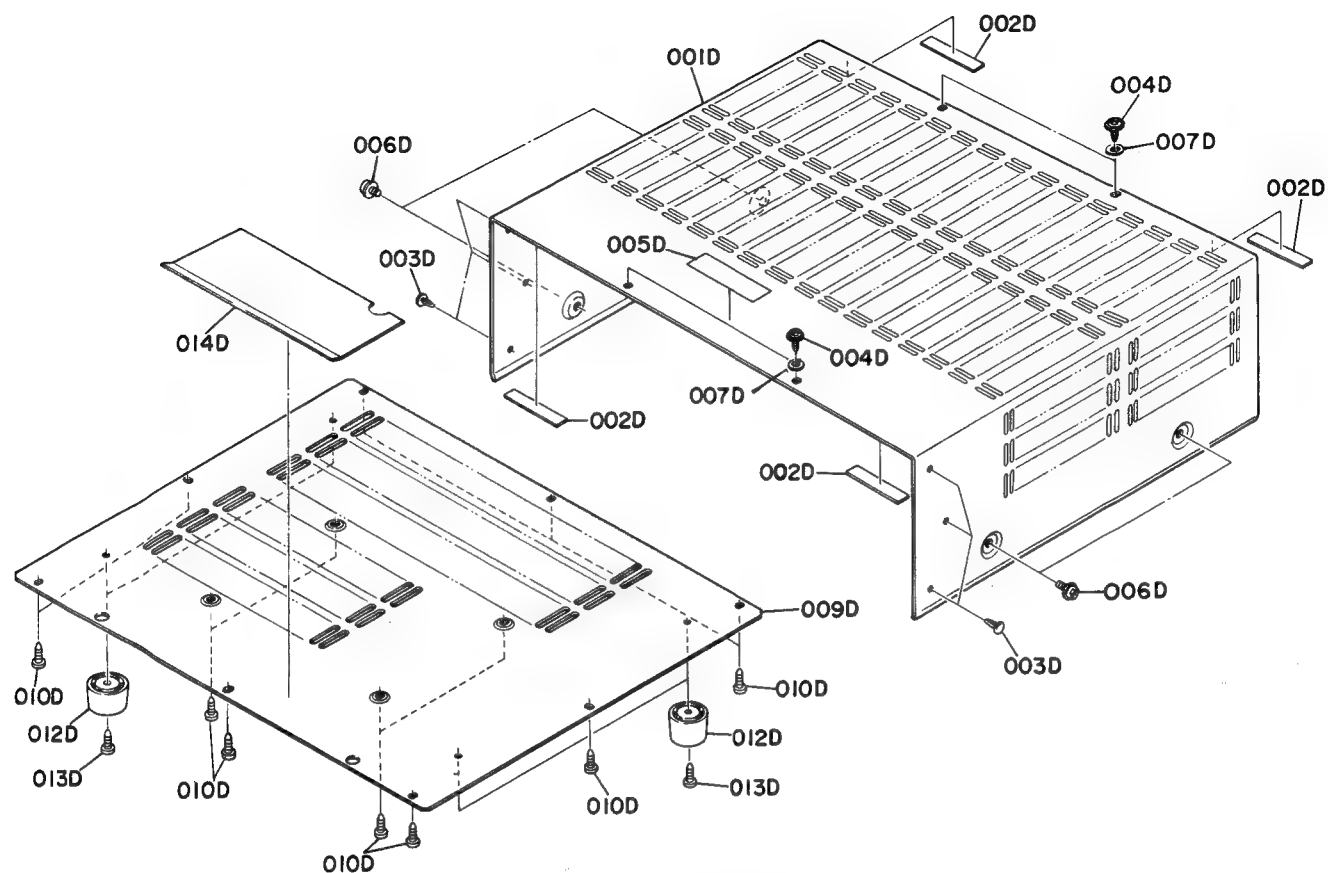
## REQUIRED MEASURING INSTRUMENTS

Table 1. List of required measuring instruments

| Item  | Purpose  |
|---|--|
| Distortion meter                                      | Measures distortion in amplifier output and its voltage. |
| Audio frequency generator                             | Signal source for audio-frequency sine and square waves. |
| Oscilloscope  | Waveform analysis and troubleshooting.                   |
| V T V M   | Voltage and resistance measurement.                      |
| AC power meter  | Monitors amplifier's primary power consumption.          |
| Voltmeter   | Monitors amplifier's primary supply voltage.             |
| Slidac (0 ~ 140V AC, 10A)                             | Adjusts amplifier's primary supply voltage.              |
| Shorting plug   | Used to short input jacks for noise prevention.          |
| Output load resistor<br>(8 $\Omega$ $\pm$ 0.5%, 250W) | Load to amplifier output (8 $\Omega$ ).                  |
| Output load resistor<br>(4 $\Omega$ $\pm$ 0.5%, 250W) | Load to amplifier output (4 $\Omega$ ).                  |



• Top Cover (C02-99)

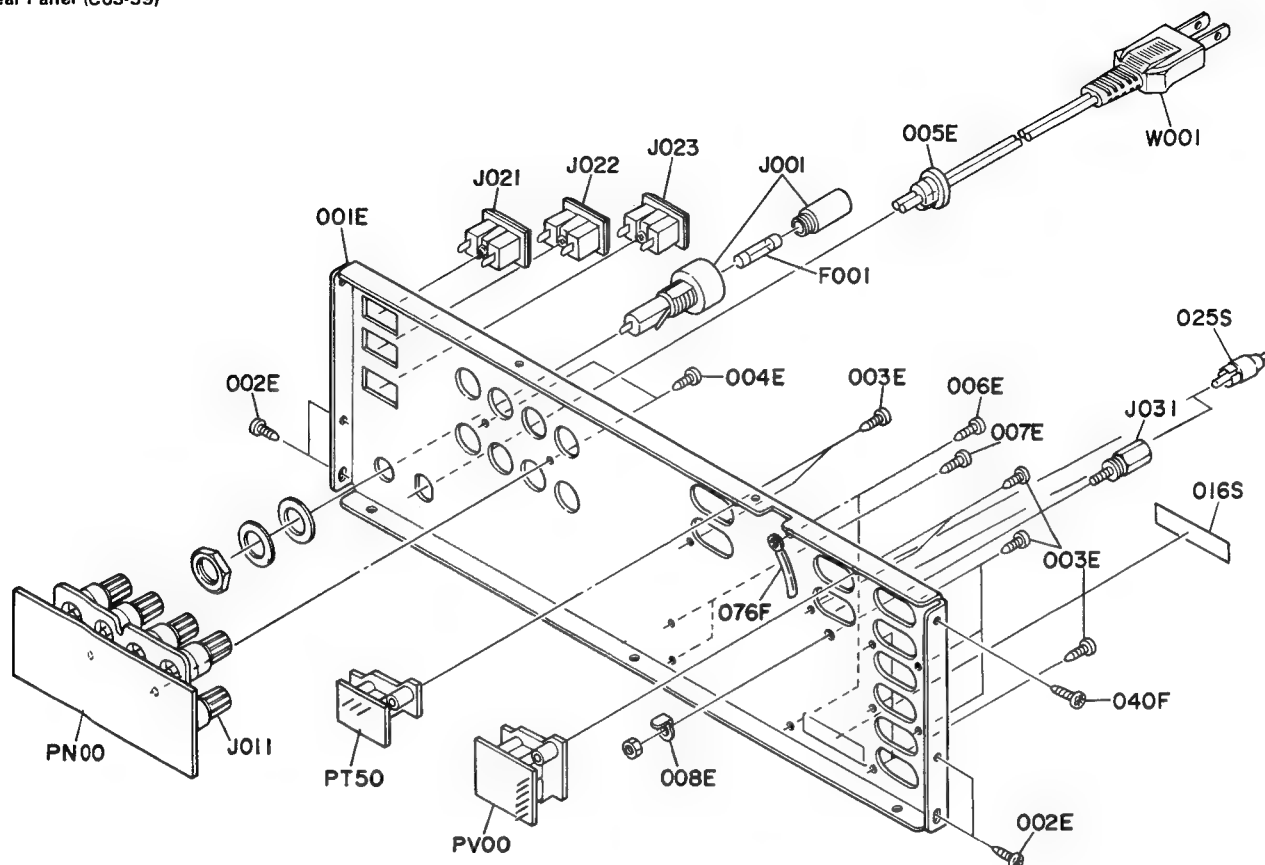


| REF.<br>DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION           |
|----------------|-----------|------------|-----------------------|
| 001D           | 1         | 2461257010 | Lid, Top Cover        |
| 002D           | 4         | 2965118010 | Spacer                |
| 003D           | 8         | 2991259010 | Bushing               |
| 004D           | 4         | 51260308Z0 | Tapped Screw 3 x 8    |
| 005D           | 1         | 2144861010 | Label                 |
| 006D           | 4         | 51480406Z9 | F. Washer Screw 4 x 6 |
| 007D           | 4         | 59030805P1 | F. Washer             |

| REF.<br>DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION               |
|----------------|-----------|------------|---------------------------|
| 009D           | 1         | 2141257010 | Lid, Bottom Cover         |
| 010D           | 12        | 51280410U0 | B.H. Tapped Screw B4 x 10 |
| 012D           | 4         | 2759057010 | Leg                       |
| 013D           | 4         | 51570410S0 | P. Taptite Screw P4 x 10  |
| 014D           | 1         | 2141120010 | Insulator                 |



• Rear Panel (C03-99)

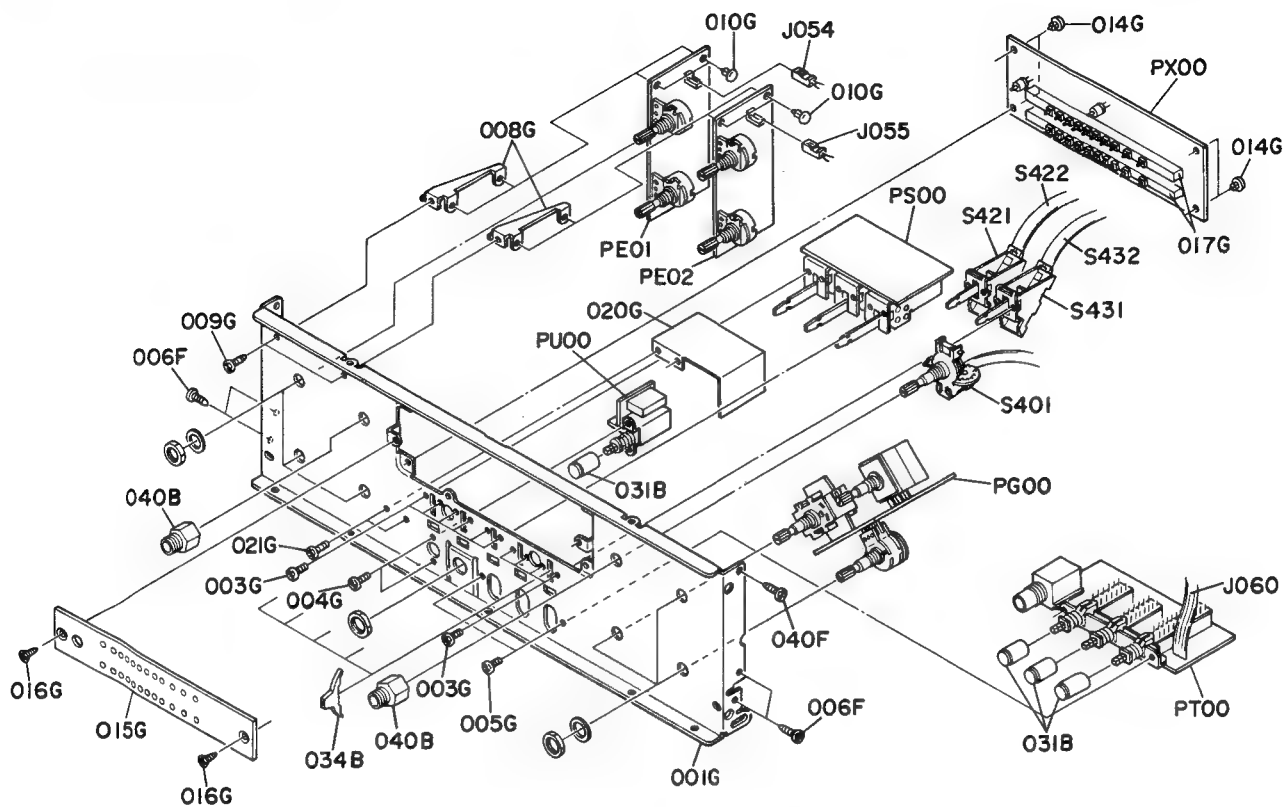


| REF.<br>DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION              |
|----------------|-----------|------------|--------------------------|
| 001E           | 1         | 2141160210 | Bracket, Rear Panel      |
| 002E           | 4         | 51100308S9 | B.H.M. Screw B3 x 8      |
| 003E           | 10        | 51280308U0 | B.H. Tapped Screw B3 x 8 |
| 004E           | 2         | 51280308U0 | B.H. Tapped Screw B3 x 8 |
| 005E           | 1         | 1455259090 | Bushing                  |
| 006E           | 2         | 51280308U0 | B.H. Tapped Screw B3 x 8 |
| 007E           | 2         | 51280308U0 | B.H. Tapped Screw B3 x 8 |
| 008E           | 1         | 62030029W0 | Lug                      |
| 040F           | 1         | 51280308B0 | B.H. Tapped Screw B3 x 8 |
| 025S           | 2         | YQ01000020 | Short Plug               |
| 076F           | 1         | 4220005040 | Clamper                  |

| REF.<br>DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION              |
|----------------|-----------|------------|--------------------------|
| 016S           | 1         | 2112265010 | Indicator                |
| △ F001         | 1         | FS10500060 | Fuse 5A 250V             |
| △ J001         | 1         | YJ08000300 | Jack, Fuse Holder        |
| J011           | 1         | YT01080030 | Terminal, Speaker System |
| △ J021         | 1         | YJ04000560 | Jack, AC Outlet          |
| △ J022         | 1         | YJ04000560 | Jack, AC Outlet          |
| △ J023         | 1         | YJ04000560 | Jack, AC Outlet          |
| J031           | 1         | YT01010050 | Terminal, Ground         |
| △ W001         | 1         | YC02400180 | A.C. Power Cord          |



- **Front Chassis and General Parts**

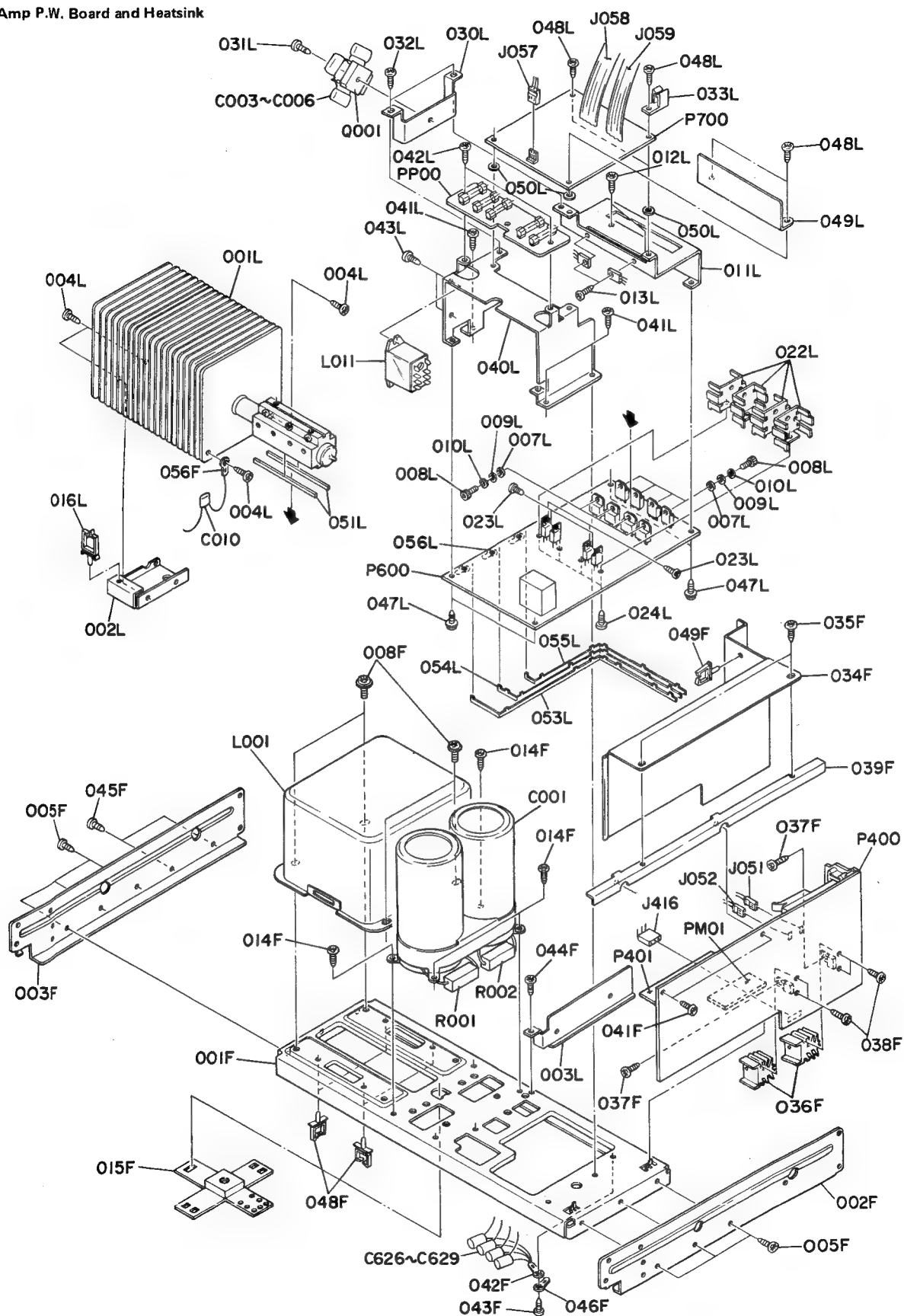


| REF.<br>DESIG. | Q'TY | PART NO.   | DESCRIPTION               |
|----------------|------|------------|---------------------------|
|                | F    |            |                           |
| 031B           | 4    | 2462154220 | Knob, Push Switch         |
| 034B           | 5    | 2144259010 | Bushing, Lever Switch     |
| 040B           | 2    | 2462101040 | Support                   |
| 006F           | 4    | 51280308B0 | B.H. Tapped Screw B3 x 8  |
| 040F           | 1    | 51280308B0 | B.H. Tapped Screw B3 x 8  |
| 001G           | 1    | 2141160010 | Bracket, Front Chassis    |
| 003G           | 10   | 51100306A9 | B.H.M. Screw B3 x 6       |
| 004G           | 2    | 51100306A9 | B.H.M. Screw B3 x 6       |
| 005G           | 2    | 51100306A9 | B.H.M. Screw B3 x 6       |
| 008G           | 2    | 2144160030 | Bracket                   |
| 009G           | 2    | 51280308B0 | B.H. Tapped Screw B3 x 8  |
| 010G           | 4    | 2276005050 | Clamper                   |
| 014G           | 4    | 2276005050 | Clamper                   |
| 015G           | 1    | 2141118010 | Spacer                    |
| 016G           | 2    | 51500306B0 | F.H. Taptite Screw F3 x 6 |
| 017G           | 2    | 2142056010 | Buffer                    |
| 020G           | 1    | 2144109020 | Shield                    |
| 021G           | 2    | 51100306A9 | B.H.M. Screw B3 x 6       |

| REF.<br>DESIG. | Q'TY | PART NO.   | DESCRIPTION                   |
|----------------|------|------------|-------------------------------|
|                | F    |            |                               |
| S401           | 1    | SR00050030 | Rotary Switch, Phone Selector |
| S421           | 1    | SC00030010 | Switch, Tape Copy             |
| S422           | 1    | SB13970010 | Switch Band, FLX              |
| S431           | 1    | SC00030010 | Switch, Tape Monitor          |
| S432           | 1    | SB13670010 | Switch Band, FLX              |
| J054           | 1    | YJ06002230 | Jack (2P)                     |
| J055           | 1    | YJ06002230 | Jack (2P)                     |
| J060           | 1    | YU05100310 | Jumper Lead (5P)              |



- **Main Amp P.W. Board and Heatsink**



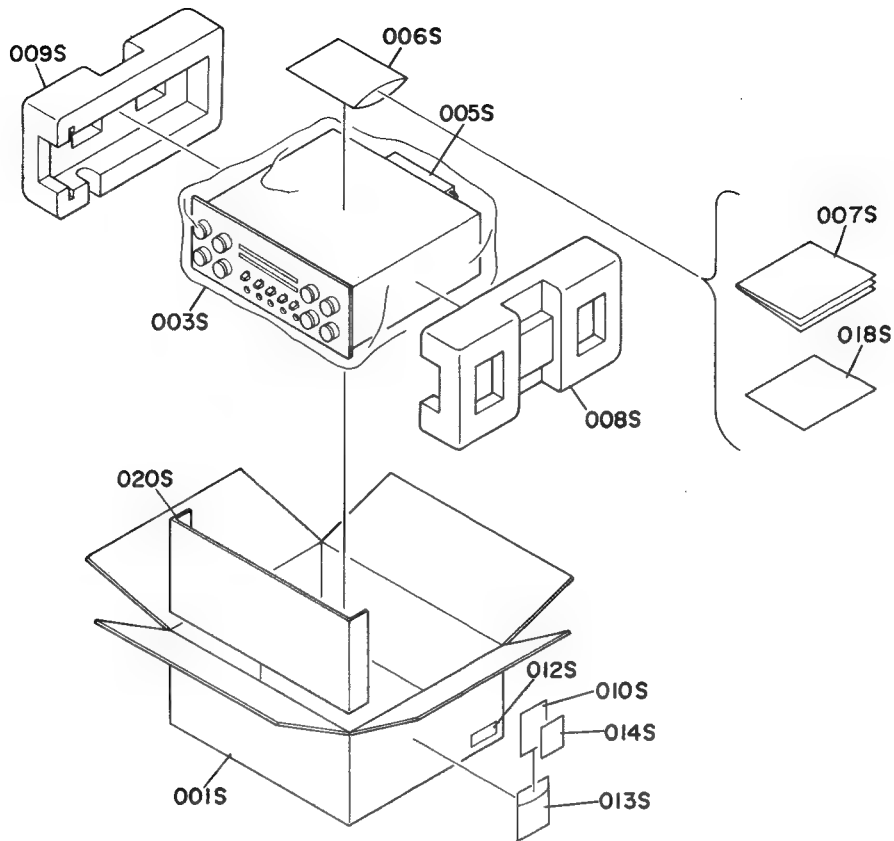


| REF.<br>DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION               |
|----------------|-----------|------------|---------------------------|
| 001F           | 1         | 2144105010 | Chassis, Center           |
| 002F           | 1         | 2979105020 | Side Chassis (R)          |
| 003F           | 1         | 2979105030 | Side Chassis (L)          |
| 005F           | 6         | 51280408B0 | B.H. Tapped Screw B4 x 8  |
| 008F           | 4         | 51490410S9 | L. Washer Screw 4 x 10    |
| 014F           | 4         | 51280308U0 | B.H. Tapped Screw B3 x 8  |
| 015F           | 1         | 2141123040 | Contactactor              |
| 034F           | 1         | 2144109010 | Shield                    |
| 035F           | 2         | 51280308U0 | B.H. Tapped Screw B3 x 8  |
| 036F           | 2         | 2144267030 | Heatsink                  |
| 037F           | 2         | 51280308B0 | B.H. Tapped Screw B3 x 8  |
| 038F           | 4         | 51300308B0 | P.H. Tapped Screw P3 x 8  |
| 039F           | 1         | 2144160080 | Bracket                   |
| 041F           | 2         | 51280308B0 | B.H. Tapped Screw B3 x 8  |
| 042F           | 1         | 62030049W0 | Lug                       |
| 044F           | 1         | 51280308B0 | B.H. Tapped Screw B3 x 8  |
| 045F           | 2         | 51280308B0 | B.H. Tapped Screw B3 x 8  |
| 046F           | 1         | 62030039W0 | Lug                       |
| 043F           | 1         | 51280308B0 | B.H. Tapped Screw B3 x 8  |
| 048F           | 4         | 2129005010 | Clamper                   |
| 049F           | 1         | 2886005060 | Clamper                   |
| 056F           | 1         | 62030039W0 | Lug                       |
| 001L           | 1         | 2141267010 | Heatsink                  |
| 002L           | 1         | 2144160040 | Bracket                   |
| 003L           | 1         | 2144160050 | Bracket                   |
| 004L           | 4         | 51280306B0 | B.H. Tapped Screw B3 x 6  |
| 007L           | 8         | 2144259020 | Bushing                   |
| 008L           | 8         | 52730310S9 | H.S. Head Bolt 3 x 10     |
| 009L           | 8         | 54020301E0 | Flat Washer, P.           |
| 010L           | 8         | 54040302N0 | Spring Washer             |
| 011L           | 1         | 2144160070 | Bracket                   |
| 012L           | 2         | 51280306U0 | B.H. Tapped Screw B3 x 6  |
| 013L           | 2         | 51280308U0 | B.H. Tapped Screw B3 x 8  |
| 016L           | 1         | 2886005020 | Clamper                   |
| 022L           | 4         | 2212267020 | Heatsink                  |
| 023L           | 8         | 51280308B0 | B.H. Tapped Screw B3 x 8  |
| 024L           | 4         | 51280308B0 | B.H. Tapped Screw B3 x 8  |
| 030L           | 1         | 2144267020 | Heatsink                  |
| 031L           | 1         | 51280314B0 | B.H. Tapped Screw B3 x 14 |
| 032L           | 2         | 51280308U0 | B.H. Tapped Screw B3 x 8  |
| 033L           | 1         | 2887005110 | Clamper                   |
| 040L           | 1         | 2144160060 | Bracket                   |
| 041L           | 3         | 51280308U0 | B.H. Tapped Screw B3 x 8  |
| 042L           | 2         | 51280308U0 | B.H. Tapped Screw B3 x 8  |
| 043L           | 2         | 51280308U0 | B.H. Tapped Screw B3 x 8  |
| 047L           | 4         | 51260308B0 | Screw 3 x 8               |
| 048L           | 4         | 51280308U0 | B.H. Tapped Screw B3 x 8  |
| 049L           | 1         | 2144109040 | Shield                    |
| 050L           | 4         | 59030808P0 | Washer                    |
| 051L           | 2         | 2144118010 | Spacer                    |
| 053L           | 1         | 2144123010 | Contactactor              |
| 054L           | 1         | 2144123020 | Contactactor              |
| 055L           | 1         | 2144123030 | Contactactor              |

| REF.<br>DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION                |
|----------------|-----------|------------|----------------------------|
| △ C001         | 1         | E118906320 | Elect Cap. 18000μF x 2 63V |
| C003           | 1         | DF17104520 | Film Cap. 0.1μF ±20% 200V  |
| C004           | 1         | DF17104520 | Film Cpa. 0.1μF ±20% 200V  |
| C005           | 1         | DF17104520 | Film Cap. 0.1μF ±20% 200V  |
| C006           | 1         | DF17104520 | Film Cap. 0.1μF ±20% 200V  |
| C010           | 1         | DF16103350 | Film Cap. 0.01μF ±10%      |
| C626           | 1         | EA10606390 | Elect Cap. 10μF 63V        |
| C627           | 1         | EA10606390 | Elect Cap. 10μF 63V        |
| C628           | 1         | EA10606390 | Elect Cap. 10μF 63V        |
| C629           | 1         | EA10606390 | Elect Cap. 10μF 63V        |
| J051           | 1         | YJ06002200 | Jack (3P)                  |
| J052           | 1         | YJ06002210 | Jack (3P)                  |
| J057           | 1         | YJ06002250 | Jack (3P)                  |
| J058           | 1         | YU08200010 | Jumper Lead (8P)           |
| J059           | 1         | YU06200010 | Jumper Lead (2P)           |
| J416           | 1         | YP01001040 | Plug (3P)                  |
| △ L001         | 1         | TS60508010 | Power Transformer          |
| △ L011         | 1         | LY20480050 | Relay FRL263               |
| △ Q001         | 1         | HD20004290 | Diode S5VB-20              |
| △ R001         | 1         | GS10222030 | Resistor 2.2KΩ ±10% 3W     |
| △ R002         | 1         | GS10222030 | Resistor 2.2KΩ ±10% 3W     |



• Packing Materials



| REF.<br>DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION        |
|----------------|-----------|------------|--------------------|
| 001S           | 1         | 2141801010 | Packing Case       |
| 003S           | 1         | 9090909040 | Polyethylene Sheet |
| 005S           | 1         | 2864804010 | Sleeve             |
| 006S           | 1         | 9013025010 | Polyethylene Bag   |
| 007S           | 1         | 2141851110 | Instructions       |
| 008S           | 1         | 2139809010 | Cushion (R)        |
| 009S           | 1         | 2139809020 | Cushion (L)        |

| REF.<br>DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION     |
|----------------|-----------|------------|-----------------|
| 010S           | 1         | 9631000110 | Guarantee Card  |
| 012S           | 2         | 9526019040 | Serial No. Card |
| 013S           | 1         | 2976813020 | Envelope        |
| 014S           | 1         | 2976851040 | Instructions    |
| 018S           | 1         | 9650000030 | S. Station Card |
| 020S           | 1         | 2144807010 | Reinforcing     |



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| REF. DESIG. | Q'TY F | PART NO.   | DESCRIPTION  |
|-------------|--------|------------|--|
| P400        | 1      | WG21410010 | <b>P400-PRE-AMP.<br/>CIRCUIT BOARD</b><br>P.W. Board, Pre-Amp. |
|             |        |            | <b>P400-CAPACITORS</b>   |
| CM01        | 1      | EA22700690 | Elect 220μF 6.3V   |
| CM02        | 1      | EA22700690 | Elect 220μF 6.3V   |
| CM03        | 1      | DF16152510 | Film 0.0015μF ±10%   |
| CM04        | 1      | DF16152510 | Film 0.0015μF ±10%   |
| CM05        | 1      | EA47701090 | Elect 470μF 10V  |
| CM06        | 1      | EA47701090 | Elect 470μF 10V  |
| CM07        | 1      | EA47701090 | Elect 470μF 10V  |
| CM08        | 1      | EA47701090 | Elect 470μF 10V  |
| CM09        | 1      | DF16222510 | Film 0.0022μF ±10%   |
| CM10        | 1      | DF16222510 | Film 0.0022μF ±10%   |
| CM11        | 1      | DF16222510 | Film 0.0022μF ±10%   |
| CM12        | 1      | DF16222510 | Film 0.0022μF ±10%   |
| CM13        | 1      | DF16222510 | Film 0.0022μF ±10%   |
| CM14        | 1      | DF16222510 | Film 0.0022μF ±10%   |
| CM15        | 1      | EA10602530 | Elect 10μF 25V   |
| CM16        | 1      | EA10602530 | Elect 10μF 25V   |
| CM17        | 1      | DF76470550 | Film 47pF ±10%   |
| CM18        | 1      | DF76470550 | Film 47pF ±10%   |
| CM19        | 1      | EA22602590 | Elect 22μF 25V   |
| CM20        | 1      | EA22602590 | Elect 22μF 25V   |
| CM21        | 1      | EA47701690 | Elect 470μF 16V  |
| CM22        | 1      | EA47701690 | Elect 470μF 16V  |
| CM23        | 1      | DF16152510 | Film 0.0015μF ±10%   |
| CM24        | 1      | DF16152510 | Film 0.0015μF ±10%   |
| C401        | 1      | DF76101550 | Film 100pF ±10%  |
| C402        | 1      | DF76101550 | Film 100pF ±10%  |
| C403        | 1      | EA47701090 | Elect 470μF 10V  |
| C404        | 1      | EA47701090 | Elect 470μF 10V  |
| C405        | 1      | EA47701090 | Elect 470μF 10V  |
| C406        | 1      | EA47701090 | Elect 470μF 10V  |
| C407        | 1      | DF16222510 | Film 0.0022μF ±10%   |
| C408        | 1      | DF16222510 | Film 0.0022μF ±10%   |
| C409        | 1      | DF16222510 | Film 0.0022μF ±10%   |
| C410        | 1      | DF16222510 | Film 0.0022μF ±10%   |
| C411        | 1      | EA10602530 | Elect 10μF 25V   |
| C412        | 1      | EA10602530 | Elect 10μF 25V   |
| C413        | 1      | DF55681090 | Film 680pF ±5%   |
| C414        | 1      | DF55681090 | Film 680pF ±5%   |
| C415        | 1      | DF74333010 | Film 0.033μF ±2%   |
| C416        | 1      | DF74333010 | Film 0.033μF ±2%   |
| C417        | 1      | DF74104010 | Film 0.1μF ±2%   |
| C418        | 1      | DF74104010 | Film 0.1μF ±2%   |
| C419        | 1      | DF14362010 | Film 3600pF ±2%  |
| C420        | 1      | DF14362010 | Film 3600pF ±2%  |
| C421        | 1      | DF64322010 | Film 3200pF ±2%  |
| C422        | 1      | DF64222010 | Film 3200pF ±2%  |
| C423        | 1      | DF16152510 | Film 1500pF ±10%   |
| C424        | 1      | DF16152510 | Film 1500pF ±10%   |
| C425        | 1      | EA22703590 | Elect 220μF 35V  |
| C426        | 1      | EA22703590 | Elect 220μF 35V  |
| C801        | 1      | EB10805070 | Elect 1000μF 50V   |
| C802        | 1      | EB10805070 | Elect 1000μF 50V   |
| C803        | 1      | DF17474510 | Film 1μF ±10%  |
| C804        | 1      | DF17474510 | Film 1μF ±10%  |
| C805        | 1      | DF55391090 | Film 390pF ±5%   |
| C806        | 1      | DF55391090 | Film 390pF ±5%   |
| C807        | 1      | EA10701030 | Elect 100μF 10V  |

| REF. DESIG. | Q'TY F | PART NO.   | DESCRIPTION   |
|-------------|--------|------------|---|
| C808        | 1      | EA10701030 | Elect 100μF 10V   |
| C809        | 1      | EA10505030 | Elect 1μF 50V   |
| C810        | 1      | EA10505030 | Elect 1μF 50V   |
| C811        | 1      | EA22703590 | Elect 220μF 35V   |
| C812        | 1      | EA22703590 | Elect 220μF 35V   |
| C813        | 1      | DF17474510 | Film 1μF ±10%   |
| C814        | 1      | DF17474510 | Film 1μF ±10%   |
| C815        | 1      | DK18103510 | Ceramic 0.01μF  |
| C816        | 1      | DK18103510 | Ceramic 0.01μF  |
| C817        | 1      | DK18103510 | Ceramic 0.01μF  |
| C818        | 1      | DK18103510 | Ceramic 0.01μF  |
|             |        |            | <b>P400-RESISTORS</b><br>(All Resistors are ±5% and ¼W) |
| RM01        | 1      | GD05151140 | 150Ω  |
| RM02        | 1      | GD05151140 | 150Ω  |
| RM03        | 1      | GD05151140 | 150Ω  |
| RM04        | 1      | GD05151140 | 150Ω  |
| RM05        | 1      | GD05010140 | 1Ω  |
| RM06        | 1      | GD05010140 | 1Ω  |
| RM07        | 1      | GD05471140 | 470Ω  |
| RM08        | 1      | GD05471140 | 470Ω  |
| RM09        | 1      | GD05471140 | 470Ω  |
| RM10        | 1      | GD05471140 | 470Ω  |
| RM11        | 1      | GD05752140 | 7.5KΩ   |
| RM12        | 1      | GD05752140 | 7.5KΩ   |
| RM13        | 1      | GD05752140 | 7.5KΩ   |
| RM14        | 1      | GD05752140 | 7.5KΩ   |
| RM15        | 1      | GD05150140 | 15Ω   |
| RM16        | 1      | GD05150140 | 15Ω   |
| RM17        | 1      | GD05150140 | 15Ω   |
| RM18        | 1      | GD05150140 | 15Ω   |
| RM19        | 1      | GM21447000 | 470Ω ±2%  |
| RM20        | 1      | GM21447000 | 470Ω ±2%  |
| RM21        | 1      | GM21447000 | 470Ω ±2%  |
| RM22        | 1      | GM21447000 | 470Ω ±2%  |
| RM23        | 1      | GM214270G0 | 27Ω ±2%   |
| RM24        | 1      | GM214270G0 | 27Ω ±2%   |
| RM25        | 1      | GD05680140 | 680Ω  |
| RM26        | 1      | GD05680140 | 680Ω  |
| RM27        | 1      | GD05680140 | 680Ω  |
| RM28        | 1      | GD05680140 | 680Ω  |
| RM29        | 1      | GD05472140 | 4.7KΩ   |
| RM30        | 1      | GD05472140 | 4.7KΩ   |
| RM31        | 1      | GD05272140 | 2.7KΩ   |
| RM32        | 1      | GD05272140 | 2.7KΩ   |
| RM33        | 1      | GD05332140 | 3.3KΩ   |
| RM34        | 1      | GD05332140 | 3.3KΩ   |
| RM39        | 1      | GD05101140 | 100Ω  |
| RM40        | 1      | GD05101140 | 100Ω  |
| RM41        | 1      | GD05273140 | 27KΩ  |
| RM42        | 1      | GD05273140 | 27KΩ  |
| RM43        | 1      | GA05471010 | 470Ω 1W   |
| RM44        | 1      | GA05471010 | 470Ω 1W   |
| R407        | 1      | GD05473140 | 47KΩ  |
| R408        | 1      | GD05473140 | 47KΩ  |
| R409        | 1      | GD05101140 | 100Ω  |
| R410        | 1      | GD05101140 | 100Ω  |



| REF.<br>DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION                |
|----------------|-----------|------------|----------------------------|
| R411           | 1         | GD05102140 | 1K $\Omega$                |
| R412           | 1         | GD05102140 | 1K $\Omega$                |
| R413           | 1         | GD05102140 | 1K $\Omega$                |
| R414           | 1         | GD05102140 | 1K $\Omega$                |
| R415           | 1         | GD05822140 | 8.2K $\Omega$              |
| R416           | 1         | GD05822140 | 8.2K $\Omega$              |
| R417           | 1         | GD05682140 | 6.8K $\Omega$              |
| R418           | 1         | GD05682140 | 6.8K $\Omega$              |
| R419           | 1         | GD05822140 | 8.2K $\Omega$              |
| R420           | 1         | GD05822140 | 8.2K $\Omega$              |
| R421           | 1         | GD05682140 | 6.8K $\Omega$              |
| R422           | 1         | GD05682140 | 6.8K $\Omega$              |
| R423           | 1         | GD05151140 | 150 $\Omega$               |
| R424           | 1         | GD05151140 | 150 $\Omega$               |
| R425           | 1         | GD05151140 | 150 $\Omega$               |
| R426           | 1         | GD05151140 | 150 $\Omega$               |
| R427           | 1         | GM21456020 | 56K $\Omega$ $\pm 2\%$     |
| R428           | 1         | GM21456020 | 56K $\Omega$ $\pm 2\%$     |
| R429           | 1         | GM21456020 | 56K $\Omega$ $\pm 2\%$     |
| R430           | 1         | GM21456020 | 56K $\Omega$ $\pm 2\%$     |
| R431           | 1         | GM214390G0 | 39 $\Omega$ $\pm 2\%$      |
| R432           | 1         | GM214390G0 | 39 $\Omega$ $\pm 2\%$      |
| R433           | 1         | GD05272140 | 2.7K $\Omega$              |
| R434           | 1         | GD05272140 | 2.7K $\Omega$              |
| R435           | 1         | GD05272140 | 2.7K $\Omega$              |
| R436           | 1         | GD05272140 | 2.7K $\Omega$              |
| R437           | 1         | GD05151140 | 150 $\Omega$               |
| R438           | 1         | GD05151140 | 150 $\Omega$               |
| R439           | 1         | GD05151140 | 150 $\Omega$               |
| R440           | 1         | GD05151140 | 150 $\Omega$               |
| R441           | 1         | GD05182140 | 1.8K $\Omega$              |
| R442           | 1         | GD05182140 | 1.8K $\Omega$              |
| R443           | 1         | GD05272140 | 2.7K $\Omega$              |
| R444           | 1         | GD05272140 | 2.7K $\Omega$              |
| R445           | 1         | GD05100140 | 10 $\Omega$                |
| R446           | 1         | GD05100140 | 10 $\Omega$                |
| R447           | 1         | GD05100140 | 10 $\Omega$                |
| R448           | 1         | GD05100140 | 10 $\Omega$                |
| R449           | 1         | GD05100140 | 10 $\Omega$                |
| R450           | 1         | GD05100140 | 10 $\Omega$                |
| R451           | 1         | GD05100140 | 10 $\Omega$                |
| R452           | 1         | GD05100140 | 10 $\Omega$                |
| R453           | 1         | GM21422010 | 2.2K $\Omega$ $\pm 2\%$    |
| R454           | 1         | GM21422010 | 2.2K $\Omega$ $\pm 2\%$    |
| R457           | 1         | GD05391140 | 390 $\Omega$               |
| R458           | 1         | GD05391140 | 390 $\Omega$               |
| R459           | 1         | GD05224140 | 220K $\Omega$              |
| R460           | 1         | GD05224140 | 220K $\Omega$              |
| R461           | 1         | GG05820120 | 82 $\Omega$ $\frac{1}{4}W$ |
| R462           | 1         | GG05820120 | 82 $\Omega$ $\frac{1}{4}W$ |
| R463           | 1         | GD05561140 | 560 $\Omega$               |
| R464           | 1         | GD05561140 | 560 $\Omega$               |
| R465           | 1         | GD05221140 | 220 $\Omega$               |
| R466           | 1         | GD05221140 | 220 $\Omega$               |
| R467           | 1         | GD05221140 | 220 $\Omega$               |
| R468           | 1         | GD05221140 | 220 $\Omega$               |

| REF.<br>DESIG.             | Q'TY<br>F | PART NO.   | DESCRIPTION                    |
|----------------------------|-----------|------------|--------------------------------|
| R801                       | 1         | GD05151140 | 150 $\Omega$                   |
| R802                       | 1         | GD05151140 | 150 $\Omega$                   |
| R803                       | 1         | GD05102140 | 1K $\Omega$                    |
| R804                       | 1         | GD05102140 | 1K $\Omega$                    |
| R805                       | 1         | GG05272120 | 2.7K $\Omega$ $\frac{1}{4}W$   |
| R806                       | 1         | GG05272120 | 2.7K $\Omega$ $\frac{1}{4}W$   |
| R807                       | 1         | GD05183140 | 18K $\Omega$                   |
| R808                       | 1         | GD05183140 | 18K $\Omega$                   |
| R809                       | 1         | GD05512140 | 5.1K $\Omega$                  |
| R810                       | 1         | GD05512140 | 5.1K $\Omega$                  |
| <b>P400-SEMICONDUCTORS</b> |           |            |                                |
| Q417                       | 1         | HT323201F0 | Transistor 2SC2320(F)          |
| Q418                       | 1         | HT323201F0 | Transistor 2SC2320(F)          |
| Q419                       | 1         | HT325912B0 | Transistor 2SC2591(Q or R)     |
| Q420                       | 1         | HT325912B0 | Transistor 2SC2591(Q or R)     |
| Q421                       | 1         | HT111112B0 | Transistor 2SA1111(Q or R)     |
| Q422                       | 1         | HT111112B0 | Transistor 2SA1111(Q or R)     |
| Q423                       | 1         | HD20011050 | Diode 1S1555                   |
| Q424                       | 1         | HD20011050 | Diode 1S1555                   |
| Q425                       | 1         | HD20011050 | Diode 1S1555                   |
| Q426                       | 1         | HD20011050 | Diode 1S1555                   |
| Q801                       | 1         | HT325912B0 | Transistor 2SC2591(Q or R)     |
| Q802                       | 1         | HT111112B0 | Transistor 2SA1111(Q or R)     |
| Q803                       | 1         | HT322402A0 | Transistor 2SC2240(GR or BL)   |
| Q804                       | 1         | HT109702A0 | Transistor 2SA970(GR or BL)    |
| Q805                       | 1         | HF200301C0 | F.E.T. 2SK30A(Y)               |
| Q806                       | 1         | HF200301C0 | F.E.T. 2SK30A(Y)               |
| Q807                       | 1         | HT317752D0 | Transistor 2SC1775A(D or E)    |
| Q808                       | 1         | HT108722D0 | Transistor 2SA872A(D or E)     |
| Q809                       | 1         | HD30008010 | Zener HZ6B1L                   |
| Q810                       | 1         | HD30008010 | Zener HZ6B1L                   |
| Q811                       | 1         | HD20015030 | Diode DS135D                   |
| Q812                       | 1         | HD20015030 | Diode DS135D                   |
| Q813                       | 1         | HD20015030 | Diode DS135D                   |
| Q814                       | 1         | HD20015030 | Diode DS135D                   |
| <b>P400-MISCELLANEOUS</b>  |           |            |                                |
| J401                       | 1         | YT02040330 | Terminal (4P) RCA              |
| J402                       | 1         | YT02040330 | Terminal (4P) RCA              |
| J403                       | 1         | YT02040330 | Terminal (4P) RCA              |
| J404                       | 1         | YP01001030 | Plug (3P)                      |
| J405                       | 1         | YP01001030 | Plug (3P)                      |
| J409                       | 1         | YP06001040 | Plug (3P)                      |
| J414                       | 1         | YP01001030 | Plug (3P)                      |
| J415                       | 1         | YP01001030 | Plug (3P)                      |
| J416                       | 1         | YP01001040 | Plug (3P)                      |
| S401                       | 1         | SR00050030 | Rotary Switch, Phono Selector  |
| S402                       | 1         | SS06060020 | Slide Switch, Phono            |
| S421                       | 1         | SC00030010 | Switch, Tape Copy              |
| S422                       | 1         | SB13970010 | Switch Band, FLX, Tape cope    |
| S423                       | 1         | SS04040040 | Slide Switch 4-4 NS Main       |
| S431                       | 1         | SC00030010 | Switch, Tape Monitor           |
| S432                       | 1         | SB13670010 | Switch Band, FLX, Tape Monitor |
| S433                       | 1         | SS04040040 | Slide Switch 4-4 NS Main       |



| REF. DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION  |
|-------------|-----------|------------|--|
| P401        | 1         | WH21441330 | <b>P401-MM TRANSISTOR BLOCK<br/>CIRCUIT BOARD</b><br>P.W. Board, MM Transistor Block |
|             |           |            | <b>P401-SEMICONDUCTORS</b>   |
| Q401        | 1         | HF201702B0 | F.E.T. 2SK170(GR or BL)  |
| Q402        | 1         | HF201702B0 | F.E.T. 2SK170(GR or BL)  |
| Q403        | 1         | HF100742B0 | F.E.T. 2SJ74(GR or BL)   |
| Q404        | 1         | HF100742B0 | F.E.T. 2SJ74(GR or BL)   |
| Q405        | 1         | HT322401B0 | Transistor 2SC2240(BL)   |
| Q406        | 1         | HT322401B0 | Transistor 2SC2240(BL)   |
| Q407        | 1         | HT109701B0 | Transistor 2SA970(BL)  |
| Q408        | 1         | HT109701B0 | Transistor 2SA970(BL)  |
| Q409        | 1         | HT109701B0 | Transistor 2SA970(BL)  |
| Q410        | 1         | HT109701B0 | Transistor 2SA970(BL)  |
| Q411        | 1         | HT322401A0 | Transistor 2SC2240(GR)   |
| Q412        | 1         | HT322401A0 | Transistor 2SC2240(GR)   |
| Q413        | 1         | HT108722D0 | Transistor 2SA872A(D or E)   |
| Q414        | 1         | HT108722D0 | Transistor 2SA872A(D or E)   |
| Q415        | 1         | HT317752D0 | Transistor 2SC1775A(D or E)  |
| Q416        | 1         | HT317752D0 | Transistor 2SC1775A(D or E)  |
|             |           |            | <b>P401-PLUGS</b>  |
| J412        | 1         | YP06000750 | Plug (14P)   |
| J413        | 1         | YP06000750 | Plug (14P)   |
|             |           |            | <b>P600-OUTPUT AMP.<br/>CIRCUIT BOARD</b><br>P.W. Board, Output Amp.                 |
| P600        | 1         | WK21441210 |  |
|             |           |            | <b>P600-CAPACITORS</b>   |
| C601        | 1         | DF76100550 | Film 10pF ±10%   |
| C602        | 1         | DF76100550 | Film 10pF ±10%   |
| C603        | 1         | EA10602530 | Elect 10μF 25V   |
| C604        | 1         | EA10602530 | Elect 10μF 25V   |
| C605        | 1         | DF16104350 | Film 0.1μF ±10%  |
| C606        | 1         | DF16104350 | Film 0.1μF ±10%  |
| C607        | 1         | EA10606390 | Elect 10μF 63V   |
| C608        | 1         | EA10606390 | Elect 10μF 63V   |
| C609        | 1         | DF17104520 | Film 0.1μF ±20%  |
| C610        | 1         | DF17104520 | Film 0.1μF ±20%  |
| C613        | 1         | EA10505030 | Elect 1μF 50V  |
| C614        | 1         | EA47602530 | Elect 47μF 25V   |
| C615        | 1         | EA22601630 | Elect 22μF 16V   |
| C616        | 1         | EA22708020 | Elect 220μF 80V  |
| C617        | 1         | EA22708020 | Elect 220μF 80V  |
| C620        | 1         | DK18103510 | Ceramic 0.01μF   |
| C621        | 1         | DK18103510 | Ceramic 0.01μF   |
| C622        | 1         | DK18103510 | Ceramic 0.01μF   |
| C625        | 1         | DF16222350 | Film 2200pF ±10%   |
|             |           |            | <b>P600-RESISTORS<br/>(All Resistors are ±5% and ¼W)</b>                             |
| R601        | 1         | GD05472140 | 4.7KΩ  |
| R602        | 1         | GD05472140 | 4.7KΩ  |
| R603        | 1         | GD05153140 | 15KΩ   |
| R604        | 1         | GD05153140 | 15KΩ   |
| R605        | 1         | GD05102140 | 1KΩ  |
| R606        | 1         | GD05102140 | 1KΩ  |
| R607        | 1         | GD05683140 | 68KΩ   |
| R608        | 1         | GD05683140 | 68KΩ   |

| REF. DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION   |
|-------------|-----------|------------|---------------|
| R609        | 1         | GD05683140 | 68KΩ          |
| R610        | 1         | GD05683140 | 68KΩ          |
| R611        | 1         | GD05821140 | 820Ω          |
| R612        | 1         | GD05821140 | 820Ω          |
| R613        | 1         | GD05101140 | 100Ω          |
| R614        | 1         | GD05101140 | 100Ω          |
| R615        | 1         | GD05101140 | 100Ω          |
| R616        | 1         | GD05101140 | 100Ω          |
| R617        | 1         | GG05102140 | 1KΩ           |
| R618        | 1         | GG05102140 | 1KΩ           |
| R619        | 1         | GA05103010 | 10KΩ 1W       |
| R620        | 1         | GA05103010 | 10KΩ 1W       |
| R621        | 1         | GG05330140 | 33Ω           |
| R622        | 1         | GG05330140 | 33Ω           |
| R623        | 1         | GG05330140 | 33Ω           |
| R624        | 1         | GG05330140 | 33Ω           |
| R625        | 1         | GG05470140 | 47Ω           |
| R626        | 1         | GG05470140 | 47Ω           |
| R627        | 1         | GG05330140 | 33Ω           |
| R628        | 1         | GG05330140 | 33Ω           |
| R629        | 1         | GG05100140 | 10Ω           |
| R630        | 1         | GG05100140 | 10Ω           |
| R631        | 1         | GG05100140 | 10Ω           |
| R632        | 1         | GG05100140 | 10Ω           |
| R633        | 1         | GG05100140 | 10Ω           |
| R634        | 1         | GG05100140 | 10Ω           |
| R635        | 1         | GG05100140 | 10Ω           |
| R636        | 1         | GG05100140 | 10Ω           |
| △ R637      | 1         | GO10222050 | 0.22Ω ±10% 5W |
| △ R638      | 1         | GO10222050 | 0.22Ω ±10% 5W |
| △ R639      | 1         | GO10222050 | 0.22Ω ±10% 5W |
| △ R640      | 1         | GO10222050 | 0.22Ω ±10% 5W |
| △ R641      | 1         | GO10222050 | 0.22Ω ±10% 5W |
| △ R642      | 1         | GO10222050 | 0.22Ω ±10% 5W |
| △ R643      | 1         | GO10222050 | 0.22Ω ±10% 5W |
| △ R644      | 1         | GO10222050 | 0.22Ω ±10% 5W |
| R645        | 1         | GD05681140 | 680Ω          |
| R646        | 1         | GD05681140 | 680Ω          |
| R647        | 1         | GD05682140 | 6.8KΩ         |
| R648        | 1         | GD05682140 | 6.8KΩ         |
| R649        | 1         | GD05682140 | 6.8KΩ         |
| R650        | 1         | GD05102140 | 1KΩ           |
| R651        | 1         | GD05273140 | 27KΩ          |
| R652        | 1         | GD05273140 | 27KΩ          |
| R653        | 1         | GA05100030 | 10Ω 3W        |
| R654        | 1         | GA05100030 | 10Ω 3W        |
| R655        | 1         | RC10022120 | 2.2Ω ±10% ½W  |
| R656        | 1         | RC10022120 | 2.2Ω ±10% ½W  |
| R657        | 1         | GD05823140 | 82KΩ          |
| R658        | 1         | GD05823140 | 82KΩ          |
| R659        | 1         | GD05393140 | 39KΩ          |
| R660        | 1         | GD05104140 | 100KΩ         |
| R661        | 1         | GD05473140 | 47KΩ          |
| R662        | 1         | GD05473140 | 47KΩ          |



| REF.<br>DESIG.             | Q'TY<br>F | PART NO.   | DESCRIPTION                |
|----------------------------|-----------|------------|----------------------------|
| R663                       | 1         | GD05274140 | 270K $\Omega$              |
| R664                       | 1         | GD05183140 | 18K $\Omega$               |
| R666                       | 1         | GD05223140 | 22K $\Omega$               |
| R667                       | 1         | GD05183140 | 18K $\Omega$               |
| R668                       | 1         | GA05152010 | 1.5K $\Omega$ 1W           |
| R669                       | 1         | GG05272120 | 2.7K $\Omega$ 1/4W         |
| R671                       | 1         | GA05103010 | 10K $\Omega$ 1W            |
| R672                       | 1         | GA05103010 | 10K $\Omega$ 1W            |
| <b>P600-SEMICONDUCTORS</b> |           |            |                            |
| Q601                       | 1         | HT315681S0 | Transistor 2SC1568(S)      |
| Q602                       | 1         | HT315681S0 | Transistor 2SC1568(S)      |
| Q603                       | 1         | HT110152A0 | Transistor 2SA1015(Q or Y) |
| Q604                       | 1         | HT110152A0 | Transistor 2SA1015(Q or Y) |
| Q605                       | 1         | HT326322R0 | Transistor 2SC2632(R or S) |
| Q606                       | 1         | HT326322R0 | Transistor 2SC2632(R or S) |
| Q607                       | 1         | HT111242R0 | Transistor 2SA1124(R or S) |
| Q608                       | 1         | HT111242R0 | Transistor 2SA1124(R or S) |
| Q609                       | 1         | HT325912B0 | Transistor 2SC2591(Q or R) |
| Q610                       | 1         | HT111112B0 | Transistor 2SA1111(Q or R) |
| Q611                       | 1         | HT325912B0 | Transistor 2SC2591(Q or R) |
| Q612                       | 1         | HT111112B0 | Transistor 2SA1111(Q or R) |
| △ Q613                     | 1         | HT407182C0 | Transistor 2SD718(R or O)  |
| △ Q614                     | 1         | HT206882C0 | Transistor 2SB688(R or O)  |
| △ Q615                     | 1         | HT407182C0 | Transistor 2SD718(R or O)  |
| △ Q616                     | 1         | HT206882C0 | Transistor 2SB688(R or O)  |
| △ Q617                     | 1         | HT407182C0 | Transistor 2SD718(R or O)  |
| △ Q618                     | 1         | HT206882C0 | Transistor 2SB688(R or O)  |
| △ Q619                     | 1         | HT407182C0 | Transistor 2SD718(R or O)  |
| △ Q620                     | 1         | HT206882C0 | Transistor 2SB688(R or O)  |
| Q621                       | 1         | HT318152A0 | Transistor 2SC1815(O or Y) |
| Q622                       | 1         | HT318152A0 | Transistor 2SC1815(O or Y) |
| Q623                       | 1         | HT110152A0 | Transistor 2SA1015(O or Y) |
| Q624                       | 1         | HC10042050 | IC TA7317P                 |
| Q625                       | 1         | HD20010210 | Diode 1S2471G              |
| Q626                       | 1         | HD20010210 | Diode 1S2471G              |
| Q627                       | 1         | HD20010210 | Diode 1S2471G              |
| Q628                       | 1         | HD20010210 | Diode 1S2471G              |
| Q629                       | 1         | HD20015030 | Diode DS135D               |
| Q630                       | 1         | HD20015030 | Diode DS135D               |
| Q631                       | 1         | HD20015030 | Diode DS135D               |
| Q632                       | 1         | HD20015030 | Diode DS135D               |
| Q633                       | 1         | HD20011010 | Diode W06C                 |
| Q634                       | 1         | HD20011010 | Diode W06C                 |
| Q635                       | 1         | HD20011010 | Diode W06C                 |
| Q636                       | 1         | HD20011010 | Diode W06C                 |
| Q637                       | 1         | HD20011050 | Diode 1S1555               |
| Q638                       | 1         | HD20011050 | Diode 1S1555               |
| Q639                       | 1         | HD20011050 | Diode 1S1555               |
| Q640                       | 1         | HD20011050 | Diode 1S1555               |
| Q641                       | 1         | HD20011050 | Diode 1S1555               |
| Q642                       | 1         | HD20015030 | Diode DS135D               |
| Q643                       | 1         | HD20015030 | Diode DS135D               |
| Q644                       | 1         | HD20015030 | Diode DS135D               |
| Q645                       | 1         | HD20015030 | Diode DS135D               |
| Q647                       | 1         | HD20011050 | Diode 1S1555               |
| Q648                       | 1         | HD20011050 | Diode 1S1555               |
| Q649                       | 1         | HD30064090 | Zener BZ-240               |
| <b>P600-MISCELLANEOUS</b>  |           |            |                            |
| L601                       | 1         | LL23915120 | Coil                       |
| L602                       | 1         | LL23915120 | Coil                       |
| L603                       | 1         | LY20240152 | Relay                      |

| REF.<br>DESIG.  | Q'TY<br>F | PART NO.   | DESCRIPTION  |
|---|-----------|------------|--|
| P700  | 1         | WK21441220 | <b>P700-VOLTAGE AMP.<br/>CIRCUIT BOARD</b><br>P.W. Board, Voltage Amp. |
| <b>P700-CAPACITORS</b>  |           |            |  |
| C701  | 1         | DF55221090 | Film 220pF $\pm 5\%$   |
| C702  | 1         | DF55221090 | Film 220pF $\pm 5\%$   |
| C703  | 1         | DF55221090 | Film 220pF $\pm 5\%$   |
| C704  | 1         | DF55221090 | Film 220pF $\pm 5\%$   |
| C709  | 1         | DF76100550 | Film 10pF $\pm 10\%$   |
| C710  | 1         | DF76100550 | Film 10pF $\pm 10\%$   |
| C711  | 1         | DF16474510 | Film 0.47 $\mu$ F $\pm 10\%$   |
| C712  | 1         | DF16474510 | Film 0.47 $\mu$ F $\pm 10\%$   |
| C713  | 1         | DF16102350 | Film 0.001 $\mu$ F $\pm 10\%$  |
| C714  | 1         | DF16102350 | Film 0.001 $\mu$ F $\pm 10\%$  |
| C715  | 1         | EA47701630 | Elect 470 $\mu$ F 16V  |
| C716  | 1         | EA47701630 | Elect 470 $\mu$ F 16V  |
| C771  | 1         | EA47602530 | Elect 47 $\mu$ F 25V   |
| C772  | 1         | EA47602530 | Elect 47 $\mu$ F 25V   |
| C773  | 1         | EA47601630 | Elect 47 $\mu$ F 16V   |
| C775  | 1         | EA10706390 | Elect 100 $\mu$ F 63V  |
| C776  | 1         | EA10706390 | Elect 100 $\mu$ F 63V  |
| C777  | 1         | DF16102510 | Film 0.001 $\mu$ F $\pm 10\%$  |
| C778  | 1         | DF16102510 | Film 0.001 $\mu$ F $\pm 10\%$  |
| C779  | 1         | DF16103350 | Film 0.01 $\mu$ F $\pm 10\%$   |
| C780  | 1         | DF15102350 | Film 0.001 $\mu$ F $\pm 5\%$   |
| C781  | 1         | DF15102350 | Film 0.001 $\mu$ F $\pm 5\%$   |
| <b>P700-RESISTORS<br/>(All Resistors are <math>\pm 5\%</math> and 1/4W)</b> |           |            |  |
| R701  | 1         | GD05224140 | 220K $\Omega$  |
| R702  | 1         | GD05224140 | 220K $\Omega$  |
| R703  | 1         | GD05102140 | 1K $\Omega$  |
| R704  | 1         | GD05102140 | 1K $\Omega$  |
| R705  | 1         | GD05561140 | 560 $\Omega$   |
| R706  | 1         | GD05561140 | 560 $\Omega$   |
| R707  | 1         | GD05561140 | 560 $\Omega$   |
| R708  | 1         | GD05561140 | 560 $\Omega$   |
| R709  | 1         | GD05103140 | 10K $\Omega$   |
| R710  | 1         | GD05103140 | 10K $\Omega$   |
| R711  | 1         | GD05103140 | 10K $\Omega$   |
| R712  | 1         | GD05103140 | 10K $\Omega$   |
| R713  | 1         | GD05102140 | 1K $\Omega$  |
| R714  | 1         | GD05102140 | 1K $\Omega$  |
| R715  | 1         | GD05102140 | 1K $\Omega$  |
| R716  | 1         | GD05102140 | 1K $\Omega$  |
| R717  | 1         | GD05473140 | 47K $\Omega$   |
| R718  | 1         | GD05473140 | 47K $\Omega$   |
| R721  | 1         | GD05101140 | 100 $\Omega$   |
| R722  | 1         | GD05101140 | 100 $\Omega$   |
| R723  | 1         | GD05102140 | 1K $\Omega$  |
| R724  | 1         | GD05102140 | 1K $\Omega$  |
| R725  | 1         | GD05154140 | 150K $\Omega$  |
| R726  | 1         | GD05154140 | 150K $\Omega$  |
| R727  | 1         | GD05562140 | 5.6K $\Omega$  |
| R728  | 1         | GD05562140 | 5.6K $\Omega$  |
| R729  | 1         | GD05181140 | 180 $\Omega$   |
| R730  | 1         | GD05181140 | 180 $\Omega$   |
| R731  | 1         | GD05151140 | 150 $\Omega$   |
| R732  | 1         | GD05151140 | 150 $\Omega$   |



| REF.<br>DESIG.             | Q'TY<br>F | PART NO.   | DESCRIPTION                  |
|----------------------------|-----------|------------|------------------------------|
| R733                       | 1         | GD05103140 | 10K $\Omega$                 |
| R734                       | 1         | GD05103140 | 10K $\Omega$                 |
| R735                       | 1         | GD05103140 | 10K $\Omega$                 |
| R736                       | 1         | GD05103140 | 10K $\Omega$                 |
| R737                       | 1         | GD05472140 | 4.7K $\Omega$                |
| R738                       | 1         | GD05472140 | 4.7K $\Omega$                |
| R739                       | 1         | GD05472140 | 4.7K $\Omega$                |
| R740                       | 1         | GD05472140 | 4.7K $\Omega$                |
| R741                       | 1         | GG05271140 | 270 $\Omega$                 |
| R742                       | 1         | GG05271140 | 270 $\Omega$                 |
| R743                       | 1         | GG05271140 | 270 $\Omega$                 |
| R744                       | 1         | GG05271140 | 270 $\Omega$                 |
| R749                       | 1         | GD05273140 | 27K $\Omega$                 |
| R750                       | 1         | GD05273140 | 27K $\Omega$                 |
| R751                       | 1         | GA05272010 | 2.7K $\Omega$ 1W             |
| R752                       | 1         | GA05182010 | 1.8K $\Omega$ 1W             |
| R753                       | 1         | GD05104140 | 100K $\Omega$                |
| R754                       | 1         | GD05104140 | 100K $\Omega$                |
| R755                       | 1         | GD05222140 | 2.2K $\Omega$                |
| R756                       | 1         | GD05222140 | 2.2K $\Omega$                |
| R757                       | 1         | GD05222140 | 2.2K $\Omega$                |
| R758                       | 1         | GD05222140 | 2.2K $\Omega$                |
| R759                       | 1         | GD05102140 | 1K $\Omega$                  |
| R760                       | 1         | GD05102140 | 1K $\Omega$                  |
| R761                       | 1         | GD05474140 | 470K $\Omega$                |
| R762                       | 1         | GD05474140 | 470K $\Omega$                |
| R763                       | 1         | GD05474140 | 470K $\Omega$                |
| R764                       | 1         | GD05474140 | 470K $\Omega$                |
| R771                       | 1         | GD05102140 | 1K $\Omega$                  |
| R772                       | 1         | GD05102140 | 1K $\Omega$                  |
| R773                       | 1         | GD05332140 | 3.3K $\Omega$                |
| R774                       | 1         | GD05332140 | 3.3K $\Omega$                |
| R775                       | 1         | GD05272140 | 2.7K $\Omega$                |
| R776                       | 1         | GD05272140 | 2.7K $\Omega$                |
| R777                       | 1         | GA05472010 | 4.7K $\Omega$ 1W             |
| R779                       | 1         | GD05393140 | 39K $\Omega$                 |
| R780                       | 1         | GD05393140 | 39K $\Omega$                 |
| R781                       | 1         | GD05123140 | 12K $\Omega$                 |
| R782                       | 1         | GD05393140 | 39K $\Omega$                 |
| R783                       | 1         | GD05911140 | 910 $\Omega$                 |
| <b>P700-SEMICONDUCTORS</b> |           |            |                              |
| Q701                       | 1         | HC10021020 | IC M47F (C)                  |
| Q702                       | 1         | HC10021020 | IC M47F (C)                  |
| Q703                       | 1         | HT322592F0 | Transistor 2SC2259(F or G)   |
| Q704                       | 1         | HT322592F0 | Transistor 2SC2259(F or G)   |
| Q705                       | 1         | HT109952A0 | Transistor 2SA995(F or G)    |
| Q706                       | 1         | HT109952A0 | Transistor 2SA995(F or G)    |
| Q707                       | 1         | HT322402A0 | Transistor 2SC2240(GR or BL) |
| Q708                       | 1         | HT322402A0 | Transistor 2SC2240(GR or BL) |
| Q709                       | 1         | HT109702A0 | Transistor 2SA970(GR or BL)  |
| Q710                       | 1         | HT109702A0 | Transistor 2SA970(GR or BL)  |
| Q713                       | 1         | HT109702A0 | Transistor 2SA970(GR or BL)  |
| Q714                       | 1         | HT109702A0 | Transistor 2SA970(GR or BL)  |
| Q715                       | 1         | HT322402A0 | Transistor 2SC2240(GR or BL) |
| Q716                       | 1         | HT322402A0 | Transistor 2SC2240(GR or BL) |
| Q717                       | 1         | HT111242R0 | Transistor 2SA1124(R or S)   |
| Q718                       | 1         | HT111242R0 | Transistor 2SA1124(R or S)   |
| Q719                       | 1         | HT326322R0 | Transistor 2SC2632(R or S)   |
| Q720                       | 1         | HT326322R0 | Transistor 2SC2632(R or S)   |
| Q721                       | 1         | HC10019020 | IC AN6552                    |
| Q722                       | 1         | HC10019020 | IC AN6552                    |

| REF.<br>DESIG.                                   | Q'TY<br>F | PART NO.   | DESCRIPTION                  |
|--|-----------|------------|------------------------------|
| Q723   | 1         | HD30025090 | Zener WZ150                  |
| Q724   | 1         | HD30025090 | Zener WZ150                  |
| Q725   | 1         | HD20011050 | Diode 1S1555                 |
| Q726   | 1         | HD20011050 | Diode 1S1555                 |
| Q727   | 1         | HD20011050 | Diode 1S1555                 |
| Q728   | 1         | HD20011050 | Diode 1S1555                 |
| Q729   | 1         | HD20011050 | Diode 1S1555                 |
| Q730   | 1         | HD20011050 | Diode 1S1555                 |
| Q771   | 1         | HT325902B0 | Transistor 2SC2590(Q or R)   |
| Q772   | 1         | HT111102B0 | Transistor 2SA1110(Q or R)   |
| Q773   | 1         | HT317752D0 | Transistor 2SC1775A(D or E)  |
| Q774   | 1         | HT108722D0 | Transistor 2SA872A(D or E)   |
| Q775   | 1         | HT317752D0 | Transistor 2SC1775A(D or E)  |
| Q776   | 1         | HT108722D0 | Transistor 2SA872A(D or E)   |
| Q777   | 1         | HD30009010 | Zener HZ12B2L                |
| <b>P700-PLUG</b>                                 |           |            |                              |
| J701   | 1         | YP01001030 | Plug (3P)                    |
| <b>PE01-TONE AMP. CIRCUIT BOARD (L-CH)</b>       |           |            |                              |
| PE01   | 1         | WK21411810 | P.W. Board, Tone Amp. (L-Ch) |
| <b>PE01-CAPACITORS</b>                           |           |            |                              |
| CE01   | 1         | EA47503530 | Elect 4.7 $\mu$ F 35V        |
| CE03   | 1         | DF76101550 | Film 100pF $\pm$ 10% 10V     |
| CE05   | 1         | EA47601030 | Elect 47 $\mu$ F 10V         |
| CE07   | 1         | DF76150550 | Film 15pF $\pm$ 10%          |
| CE09   | 1         | DF76101550 | Film 100pF $\pm$ 10%         |
| CE11   | 1         | DF76470550 | Film 47pF $\pm$ 10%          |
| CE13   | 1         | DF15563300 | Film 0.056 $\mu$ F $\pm$ 5%  |
| CE15   | 1         | DF15563300 | Film 0.056 $\mu$ F $\pm$ 5%  |
| CE17   | 1         | DF15393300 | Film 0.039 $\mu$ F $\pm$ 5%  |
| CE19   | 1         | DF16472350 | Film 4700pF $\pm$ 10%        |
| CE21   | 1         | EA47503530 | Elect 4.7 $\mu$ F 35V        |
| CE23   | 1         | EA10702530 | Elect 100 $\mu$ F 25V        |
| CE25   | 1         | EA10702530 | Elect 100 $\mu$ F 25V        |
| <b>PE01-RESISTORS</b>                            |           |            |                              |
| (All Resistors are $\pm$ 5% and $\frac{1}{4}$ W) |           |            |                              |
| RE01   | 1         | GD05684140 | 680K $\Omega$                |
| RE03   | 1         | GD05224140 | 220K $\Omega$                |
| RE05   | 1         | GD05331140 | 330 $\Omega$                 |
| RE07   | 1         | GD05331140 | 330 $\Omega$                 |
| RE09   | 1         | GD05182140 | 1.8K $\Omega$                |
| RE11   | 1         | GD05224140 | 220K $\Omega$                |
| RE13   | 1         | GD05822140 | 8.2K $\Omega$                |
| RE15   | 1         | GD05822140 | 8.2K $\Omega$                |
| RE17   | 1         | RK05030330 | 50K $\Omega$ (B), Variable   |
| RE19   | 1         | RK02030530 | 20K $\Omega$ (W), Variable   |
| RE21   | 1         | GD05473140 | 47K $\Omega$                 |
| RE23   | 1         | GD05391140 | 390 $\Omega$                 |
| RE25   | 1         | GD05224140 | 220K $\Omega$                |
| RE27   | 1         | GD05182140 | 1.8K $\Omega$                |
| RE29   | 1         | GG05332140 | 3.3K $\Omega$                |
| RE31   | 1         | GG05332140 | 3.3K $\Omega$                |
| <b>PE01-IC</b>                                   |           |            |                              |
| QE01   | 1         | HC10011200 | IC M5213L                    |
| <b>PE01-PLUG</b>                                 |           |            |                              |
| JE01   | 1         | YP10001980 | Plug (2P)                    |



| REF. DESIG. | Q'TY F | PART NO.   | DESCRIPTION   |
|-------------|--------|------------|---|
| PE02        | 1      | WK21411820 | <b>PE02-TONE AMP. CIRCUIT BOARD (R-CH)</b><br>P.W. Board, Tone Amp. (R-Ch)                  |
| CE02        | 1      | EA47503530 | <b>PE02-CAPACITORS</b><br>Elect 4.7 $\mu$ F 35V   |
| CE04        | 1      | DF76101550 | Film 100pF $\pm 10\%$   |
| CE06        | 1      | EA47601030 | Elect 47 $\mu$ F 10V  |
| CE08        | 1      | DF76150550 | Film 15pF $\pm 10\%$  |
| CE10        | 1      | DF76101550 | Film 100pF $\pm 10\%$   |
| CE12        | 1      | DF76470550 | Film 47pF $\pm 10\%$  |
| CE14        | 1      | DF15563300 | Film 0.056 $\mu$ F $\pm 5\%$  |
| CE16        | 1      | DF15563300 | Film 0.056 $\mu$ F $\pm 5\%$  |
| CE18        | 1      | DF15393300 | Film 0.039 $\mu$ F $\pm 5\%$  |
| CE20        | 1      | DF16472350 | Film 4700pF $\pm 10\%$  |
| CE22        | 1      | EA47503530 | Elect 4.7 $\mu$ F 35V   |
| CE24        | 1      | EA10702530 | Elect 100 $\mu$ F 25V   |
| CE26        | 1      | EA10702530 | Elect 100 $\mu$ F 25V   |
| RE02        | 1      | GD05684140 | <b>PE02-RESISTORS</b><br>(All Resistors are $\pm 5\%$ and $\frac{1}{4}W$ )<br>680K $\Omega$ |
| RE04        | 1      | GD05224140 | 220K $\Omega$   |
| RE06        | 1      | GD05331140 | 330 $\Omega$  |
| RE08        | 1      | GD05331140 | 330 $\Omega$  |
| RE10        | 1      | GD05182140 | 1.8K $\Omega$   |
| RE12        | 1      | GD05224140 | 220K $\Omega$   |
| RE14        | 1      | GD05822140 | 8.2K $\Omega$   |
| RE16        | 1      | GD05822140 | 8.2K $\Omega$   |
| RE18        | 1      | RK05030330 | 50K $\Omega$ (B), Variable  |
| RE20        | 1      | RK02030530 | 20K $\Omega$ (W), Variable  |
| RE22        | 1      | GD05473140 | 47K $\Omega$  |
| RE24        | 1      | GD05391140 | 390 $\Omega$  |
| RE26        | 1      | GD05224140 | 220K $\Omega$   |
| RE28        | 1      | GD05182140 | 1.8K $\Omega$   |
| RE30        | 1      | GG05332140 | 3.3K $\Omega$   |
| RE32        | 1      | GG05332140 | 3.3K $\Omega$   |
| QE02        | 1      | HC10011200 | <b>PE02-IC</b><br>IC M5213L   |
| JE02        | 1      | YP10001980 | <b>PE02-PLUG</b><br>Plug (2P)   |
| PG00        | 1      | WH21441310 | <b>PG00-BALANCE CONTROL CIRCUIT BOARD</b><br>P.W. Board, Balance Control                    |
| RG01        | 1      | RM01040300 | <b>PG00-RESISTORS</b><br>100K $\Omega$ x 2 Variable, Balance                                |
| RG02        | 1      | RM01040360 | 100K $\Omega$ x 2 Variable  |
| SG01        | 1      | SR04050180 | <b>PG00-SWITCH</b><br>Rotary Switch, Mode   |
| PM01        | 1      | WH21441320 | <b>PM01-MC TRANSISTOR BLOCK CIRCUIT BOARD</b><br>P.W. Board, MC Transistor Block            |
| RM35        | 1      | GF05100140 | <b>PM01-RESISTORS</b><br>10 $\Omega$ $\pm 5\%$ $\frac{1}{4}W$                               |
| RM36        | 1      | GF05100140 | 10 $\Omega$ $\pm 5\%$ $\frac{1}{4}W$  |
| RM37        | 1      | GF05100140 | 10 $\Omega$ $\pm 5\%$ $\frac{1}{4}W$  |
| RM38        | 1      | GF05100140 | 10 $\Omega$ $\pm 5\%$ $\frac{1}{4}W$  |

| REF. DESIG.        | Q'TY F | PART NO.   | DESCRIPTION  |
|--------------------|--------|------------|--|
| QM01               | 1      | HT325451E0 | <b>PM01-SEMICONDUCTORS</b><br>Transistor 2SC2545(E)                        |
| QM02               | 1      | HT325451E0 | Transistor 2SC2545(E)  |
| QM03               | 1      | HT110831E0 | Transistor 2SA1083(E)  |
| QM04               | 1      | HT110831E0 | Transistor 2SA1083(E)  |
| QM17               | 1      | HT108722D0 | Transistor 2SA872A(D or E)   |
| QM18               | 1      | HT108722D0 | Transistor 2SA872A(D or E)   |
| QM19               | 1      | HT317752D0 | Transistor 2SC1775A(D or E)  |
| QM20               | 1      | HT317752D0 | Transistor 2SC1775A(D or E)  |
| QM21               | 1      | HT323201F0 | Transistor 2SC2320(E or F)   |
| QM22               | 1      | HT323201F0 | Transistor 2SC2320(E or F)   |
| QM23               | 1      | HT406661C0 | Transistor 2SD666(C)   |
| QM24               | 1      | HT406661C0 | Transistor 2SD666(C)   |
| QM25               | 1      | HT206661C0 | Transistor 2SB646(C)   |
| QM26               | 1      | HT206461C0 | Transistor 2SB646(C)   |
| J410               | 1      | YP06000750 | <b>PM01-PLUGS</b><br>Plug (14P)  |
| J411               | 1      | YP06000750 | Plug (14P)   |
| PN00               | 1      | WF21440020 | <b>PN00-SPEAKER TERMINAL CIRCUIT BOARD</b><br>P.W. Board, Speaker Terminal |
| J011               | 1      | YT01080030 | Terminal, Speaker (8P)   |
| PP00               | 1      | YF21440010 | <b>PP00-FUSE CIRCUIT BOARD</b><br>P.W. Board, Fuse                         |
| $\Delta$ FP01<br>} | 5      | FS10050080 | Fuse 0.5A 250V   |
| $\Delta$ FP05<br>} | 10     | YJ08000170 | Jack, Fuse Holder  |
| JP01<br>}          |        |            |  |
| JP10               |        |            |  |
| PS00               | 1      | WK21411840 | <b>PS00-LEVER SWITCH CIRCUIT BOARD</b><br>P.W. Board, Lever Switch         |
| CS01               | 1      | EQ10602510 | <b>PS00-CAPACITORS</b><br>Elect 10 $\mu$ F 25V                             |
| CS02               | 1      | EQ10602510 | Elect 10 $\mu$ F 25V   |
| CS03               | 1      | DF15683350 | Film 0.068 $\mu$ F $\pm 5\%$   |
| CS04               | 1      | DF15683350 | Film 0.068 $\mu$ F $\pm 5\%$   |
| CS05               | 1      | DF16105510 | Film 1 $\mu$ F $\pm 10\%$  |
| CS06               | 1      | DF16105510 | Film 1 $\mu$ F $\pm 10\%$  |
| RS01               | 1      | GD05822140 | <b>PS00-RESISTORS</b><br>8.2K $\Omega$ $\pm 5\%$ $\frac{1}{4}W$            |
| RS02               | 1      | GD05822140 | 8.2K $\Omega$ $\pm 5\%$ $\frac{1}{4}W$                                     |
| SS01               | 1      | SC04020170 | <b>PS00-SWITCHES</b><br>Switch, ESL-374                                    |
| SS02               | 1      | SC02020370 | Switch, EQ, Subsonic   |
| SS03               | 1      | SC02020370 | Switch, Loudness   |



| REF.<br>DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION  |
|----------------|-----------|------------|--|
| PT00           | 1         | WK21411850 | <b>PT00-SPEAKER SWITCH<br/>CIRCUIT BOARD</b><br>P.W. Board, Speaker Switch                 |
| CT01           | 1         | EA33703530 | <b>PT00-CAPACITOR</b><br>Elect 330 $\mu$ F 35V   |
| RT01           | 1         | GD05153140 | <b>PT00-RESISTORS</b><br>(All Resistors are $\pm 5\%$ and $\frac{1}{4}W$ )<br>15K $\Omega$ |
| RT02           | 1         | GD05153140 | 15K $\Omega$   |
| RT03           | 1         | GD05333140 | 33K $\Omega$   |
| RT04           | 1         | GD05333140 | 33K $\Omega$   |
| RT05           | 1         | GD05102140 | 1K $\Omega$  |
| RT06           | 1         | GD05102140 | 1K $\Omega$  |
| RT07           | 1         | RA05020130 | 4.7K $\Omega$ (B), Trimming  |
| RT08           | 1         | RA05020130 | 4.7K $\Omega$ (B), Trimming  |
| RT09           | 1         | GD05101140 | 100 $\Omega$   |
| RT10           | 1         | GD05101140 | 100 $\Omega$   |
| RT11           | 1         | RA01020150 | 1K $\Omega$ (B), Trimming  |
| RT12           | 1         | RA01020150 | 1K $\Omega$ (B), Trimming  |
| RT13           | 1         | GD05221140 | 220 $\Omega$   |
| RT15           | 1         | GD05331120 | 330 $\Omega$ $\frac{1}{4}W$  |
| RT16           | 1         | GD05331120 | 330 $\Omega$ $\frac{1}{4}W$  |
| RT17           | 1         | GD05752140 | 7.5K $\Omega$  |
| RT18           | 1         | GD05752140 | 7.5K $\Omega$  |
| RT19           | 1         | GD05471140 | 470 $\Omega$   |
| RT20           | 1         | GD05471140 | 470 $\Omega$   |
| QT01           | 1         | HD20015030 | <b>PT00-DIODE</b><br>Diode DS135-D   |
| JT01           | 1         | YJ01001340 | <b>PT00-MISCELLANEOUS</b><br>Jack, Headphone   |
| ST01           | 1         | SP06030160 | Push Switch, Speaker   |
| PT50           | 1         | WK21411870 | <b>PT50-PRE OUT<br/>CIRCUIT BOARD</b><br>P.W. Board, Pre Out                               |
| JT51           | 1         | YT02020220 | Terminal (2P) RCA  |
| PU00           | 1         | WK21411880 | <b>PU00-POWER SWITCH<br/>CIRCUIT BOARD</b><br>P.W. Board, Power Switch                     |
| △ GU01         | 1         | BF10400030 | Cap. Comp. 0.1 $\mu$ F + 120 $\Omega$  |
| △ SU01         | 1         | SP01010320 | Push Switch, Power   |
| PV00           | 1         | WK21411860 | <b>PV00-PHONO INPUT<br/>CIRCUIT BOARD</b><br>P.W. Board, Phono Input                       |
| CV01           | 1         | DK18473320 | Ceramic Cap. 0.047 $\mu$ F   |
| CV02           | 1         | DK18473320 | Ceramic Cap. 0.047 $\mu$ F   |
| JV01           | 1         | YT02040320 | Terminal (4P) RCA  |

| REF.<br>DESIG. | Q'TY<br>F | PART NO.   | DESCRIPTION   |
|----------------|-----------|------------|---|
| PX00           | 1         | WK21411830 | <b>PX00-PEAK INDICATOR<br/>CIRCUIT BOARD</b><br>P.W. Board, Peak Indicator                  |
| CX01           | 1         | EE10505040 | <b>PX00-CAPACITORS</b><br>Elect 1 $\mu$ F 50V   |
| CX02           | 1         | EE10505040 | Elect 1 $\mu$ F 50V   |
| CX03           | 1         | DF16223300 | Film 0.022 $\mu$ F $\pm 10\%$   |
| CX04           | 1         | DF16223300 | Film 0.022 $\mu$ F $\pm 10\%$   |
| CX05           | 1         | DF16474510 | Film 0.47 $\mu$ F $\pm 10\%$  |
| CX06           | 1         | EA10702530 | Elect 100 $\mu$ F 25V   |
| RX01           | 1         | GD05334140 | <b>PX00-RESISTORS</b><br>(All Resistors are $\pm 5\%$ and $\frac{1}{4}W$ )<br>330K $\Omega$ |
| RX02           | 1         | GD05334140 | 330K $\Omega$   |
| RX03           | 1         | GG05391120 | 390 $\Omega$ $\frac{1}{4}W$   |
| RX04           | 1         | GA05101010 | 100 $\Omega$ 1W   |
| RX05           | 1         | GD05822140 | 8.2K $\Omega$   |
| RX06           | 1         | GD05822140 | 8.2K $\Omega$   |
| RX07           | 1         | GD05102140 | 1K $\Omega$   |
| RX08           | 1         | GD05102140 | 1K $\Omega$   |
| RX09           | 1         | RA01020150 | 1K $\Omega$ (B), Trimming   |
| RX10           | 1         | RA01020150 | 1K $\Omega$ (B), Trimming   |
| RX11           | 1         | GD05563140 | 56K $\Omega$  |
| RX12           | 1         | GD05563140 | 56K $\Omega$  |
| RX13           | 1         | GD05682140 | 6.8K $\Omega$   |
| RX14           | 1         | GD05682140 | 6.8K $\Omega$   |
| RX15           | 1         | GD05473140 | 47K $\Omega$  |
| RX16           | 1         | GD05473140 | 47K $\Omega$  |
| RX17           | 1         | GD05104140 | 100K $\Omega$   |
| RX18           | 1         | GD05104140 | 100K $\Omega$   |
| RX19           | 1         | GD05102140 | 1K $\Omega$   |
| RX20           | 1         | GD05102140 | 1K $\Omega$   |
| RX21           | 1         | GD05472140 | 4.7K $\Omega$   |
| RX22           | 1         | GD05472140 | 4.7K $\Omega$   |
| RX23           | 1         | GG05222120 | 2.2K $\Omega$   |
| QX01           | 1         | HC10002380 | <b>PX00-SEMICONDUCTORS</b><br>IC $\mu$ AA170  |
| QX02           | 1         | HC10002380 | IC $\mu$ AA170  |
| QX03           | 1         | HC10041050 | IC TA7318P-2  |
| QX04           | 1         | HI10004030 | L.E.D. SLP-132B   |
| QX05           | 1         | HI10004030 | L.E.D. SLP-132B   |
| QX07           | 1         | HD20011050 | Diode 1S1555  |
| QX08           | 1         | HD20011050 | Diode 1S1555  |
| QX09           | 1         | HD20011050 | Diode 1S1555  |
| QX10           | 1         | HD20011050 | Diode 1S1555  |
| QX11           | 1         | HI10017020 | L.E.D. LN36BP LCF   |



| REF.<br>DESIG. | Q'TY | PART NO.   | DESCRIPTION |            |
|----------------|------|------------|-------------|------------|
|                | F    |            |             |            |
| QX12           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX13           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX14           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX15           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX16           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX17           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX18           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX19           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX20           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX21           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
|                |      |            |             |            |
| QX22           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX23           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX24           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX25           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX26           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX27           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX28           | 1    | HI10017020 | L.E.D.      | LN36BP LCF |
| QX29           | 1    | HI10009020 | L.E.D.      | LN26RP LCF |
| QX30           | 1    | HI10009020 | L.E.D.      | LN26RP LCF |
| QX31           | 1    | HI10009020 | L.E.D.      | LN26RP LCF |
|                |      |            |             |            |
| QX32           | 1    | HI10009020 | L.E.D.      | LN26RP LCF |
| QX33           | 1    | HI10009020 | L.E.D.      | LN26RP LCF |
| QX34           | 1    | HI10009020 | L.E.D.      | LN26RP LCF |

| REF.<br>DESIG. | Q'TY | PART NO. | DESCRIPTION |
|----------------|------|----------|-------------|
|                | F    |          |             |
|                |      |          |             |

|          |                     |
|----------|---------------------|
| (W01-99) | Assembly and Wiring |
| (T01-99) | Adjustment          |
| (X01-00) | Correction          |



## 規格

Model Pm-5

|                         |              |               |
|-------------------------|--------------|---------------|
| 定格出力(20Hz～20kHz両ch同時駆動) | 80W×2(8Ω負荷)  | CLASS AB      |
|                         | 20W×2(8Ω負荷)純 | CLASS A       |
| 出力帯域幅(8Ω負荷、THD0.05%)    |              | 5Hz～90kHz     |
| 全高調波歪率(20Hz～20kHz、8Ω負荷) |              | 0.015%        |
| 混変調歪率                   |              | 0.015%        |
| 周波数特性(20Hz～20kHz)       |              | +0、-0.2dB     |
| (5Hz～100kHz)            |              | +1、-1dB       |
| ダンピングファクター              |              | 100           |
| 入力感度およびインピーダンス          |              |               |
| フォノ1(MM)                |              | 2.2mV/47kΩ    |
| フォノ1(MC)                |              | 220μV/75Ω     |
| フォノ2(MM)                |              | 2.2mV/47kΩ    |
| 高レベル                    |              | 150mV/40kΩ    |
| RIAA偏差(20Hz～20kHz)      |              | ±0.2dB        |
| 入力等化雑音(フォノ・IHF-A)       |              | 0.24μV        |
| S/N(IHF-Aネットワーク)フォノMM   |              | 86dB          |
| フォノMC                   |              | 68dB          |
| テープ・チューナー・AUX           |              | 110dB         |
| フォノ最大許容入力・フォノMM         |              | 220mV.1kHz    |
| フォノMC                   |              | 20mV.1kHz     |
| トーンコントロール特性(低域100Hz)    |              | ±8dB          |
| (高域10kHz)               |              | ±8dB          |
| その他                     |              |               |
| 電源                      |              | 100V 50/60Hz  |
| 消費電力(電気用品取締法)           |              | 200W          |
| 外形寸法(幅×高さ×奥行き)          |              | 416×146×332mm |
| 重量(セット単体)               |              | 13kg          |

本機の規格および外観は改良のため予告なく変更することがありますが、ご了承ください。



**NOTES.**



# 回路図

Q401, Q402  
2SK170(GR or BL)  
Q403, Q404  
2SJ74(GR or BL)  
Q405, Q406, Q411, Q412  
2SC2240(GR or BL)

Q407, Q408, Q409, Q410  
2SA970(GR or BL)  
Q413, Q414  
2SA872A(D or E)  
Q415, Q416  
2SC1775A(D or E)

Q417, Q418  
2SC2320(F)  
Q419, Q420  
2SC2591(Q or R)  
Q421, Q422  
2SA1111(Q or R)

Q423 ~ Q426  
IS1555  
Q427, Q428  
2SC2545(E)  
Q429, Q430  
2SA1083(E)

Q431, Q432  
2SA872A(D or E)  
Q433, Q434  
2SC1775A(D or E)  
Q435, Q436  
2SC2545(E)  
Q437, Q438  
2SC2320

Q439, Q440  
2SC2545(E)  
Q441, Q442  
2SC2320

Q443, Q444  
2SC2545(E)  
Q445, Q446  
2SC2320

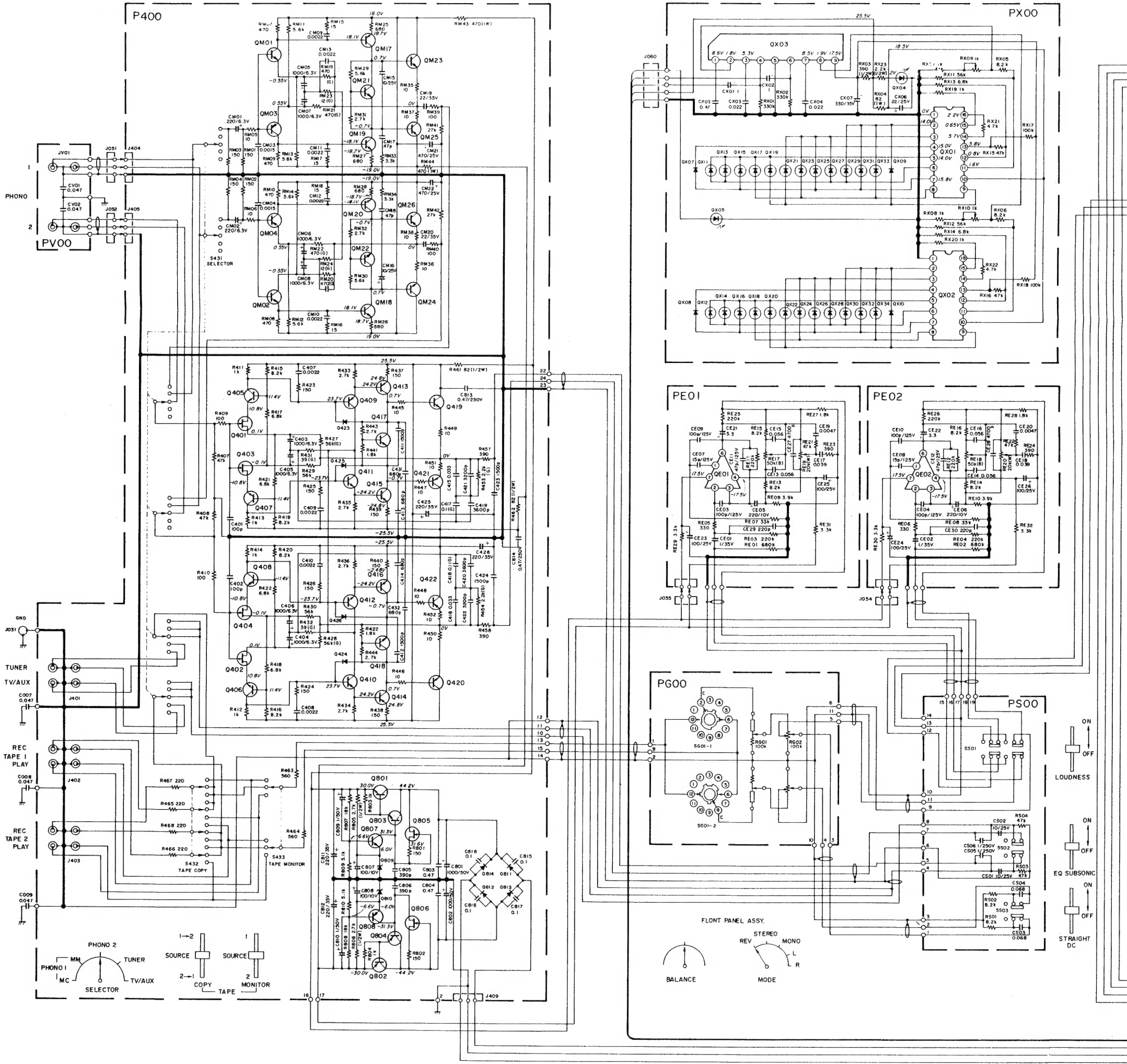
Q447, Q448  
2SC2545(E)  
Q449, Q450  
2SC2320

Q451, Q452  
2SC2545(E)  
Q453, Q454  
2SC2320

Q455, Q456  
2SC2545(E)  
Q457, Q458  
2SC2320

Q459, Q460  
2SC2545(E)  
Q461, Q462  
2SC2320

Q463, Q464  
2SC2545(E)  
Q465, Q466  
2SC2320

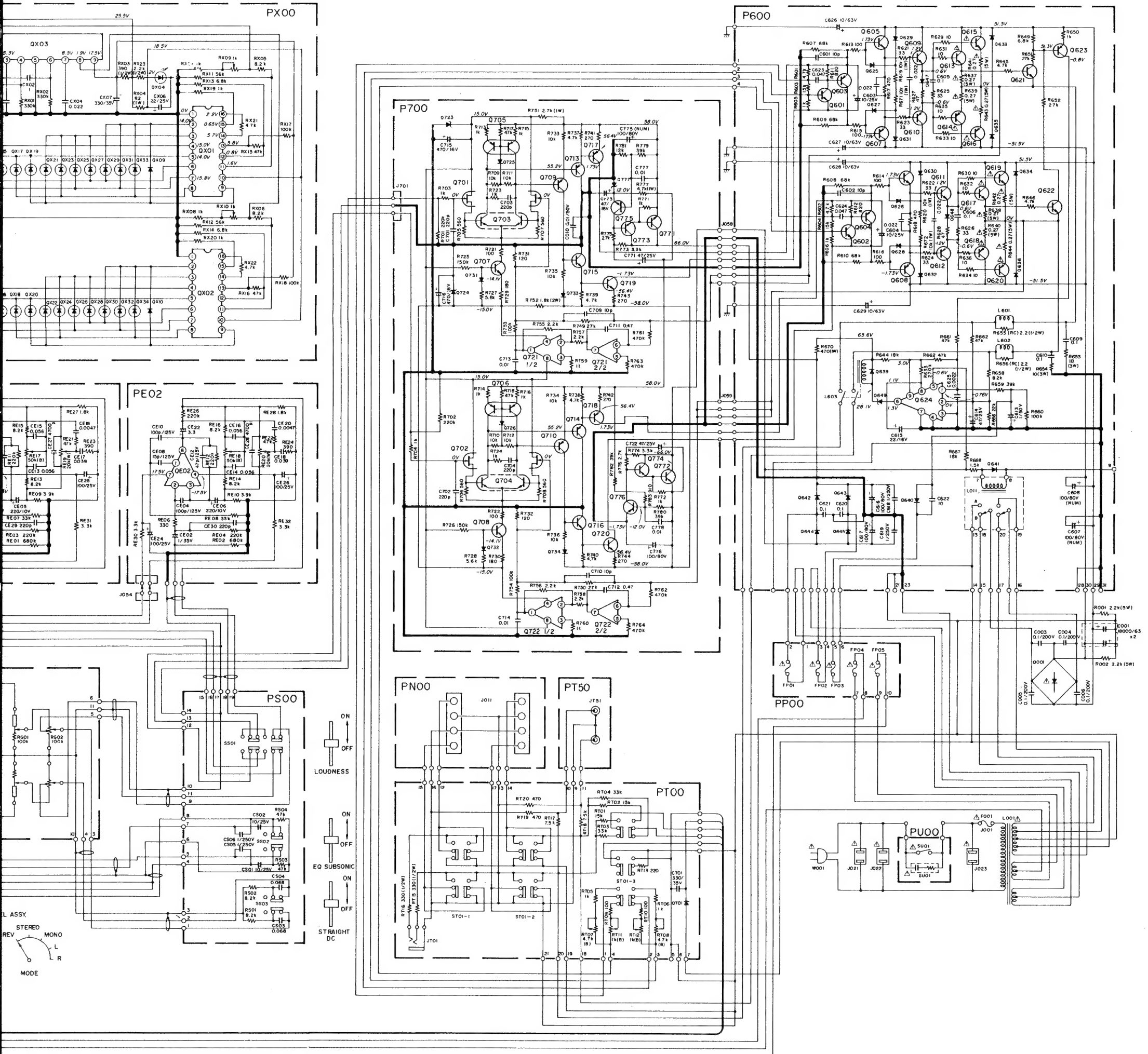


(安全上の注意: △が付いている部品は、安全上重要な部品です。必ず指定されている部品番号の部品を使用してください。)  
本機の回路は改良のため予告なく変更することがありますが、ご了承ください。



# Model Pm-5

|                      |                       |                     |                                |   |                                |                       |                        |                                      |                                |   |                                |                                    |                |
|----------------------|-----------------------|---------------------|--------------------------------|---|--------------------------------|-----------------------|------------------------|--------------------------------------|--------------------------------|---|--------------------------------|------------------------------------|----------------|
| QE01, QE02<br>M5213L | QX03<br>TA7318P       | QX11~QX28<br>LN368P | Q701, Q702<br>M477(C)          | Q707, Q708, Q715, Q716<br>2SC2240(GR or BL) | Q717, Q718<br>2SA1124 (R or S) | Q723, Q724<br>WZ150   | Q772<br>2SA1110        | Q601, Q602<br>2SC1568 (S)            | Q605, Q606<br>2SC2632 (R or S) | Q610, Q612<br>2SA1111 (Q or R)            | Q621, Q622<br>2SC1815 (O or Y) | Q629 ~ Q632, Q642 ~ Q645<br>DS1350 | Q649<br>8Z-240 |
| QX01, QX02<br>UAA170 | QX04, QX05<br>SLP132B | QX29~QX34<br>LN268P | Q703, Q704<br>2SC2259 (F or G) | Q709, Q710, Q713, Q714<br>2SA970 (GR or BL) | R719, R720<br>2SC2632 (R or S) | Q725 ~ Q730<br>1S1555 | Q773, Q775<br>2SC1775A | Q603, Q604, Q623<br>2SA1015 (O or Y) | Q607, Q608<br>2SA1124 (R or S) | Q613, Q615, Q617, Q619<br>2SD718 (R or O) | Q624<br>TA7317P                | Q633 ~ Q636<br>W06C                |                |
|                      | QX07~QX10<br>1S1555   |                     | Q705, Q706<br>2SA995 (F or G)  |   | Q721, Q722<br>AN6552 (4558)    | Q771<br>2SC2590       | Q774<br>2SA812A        |                                      | Q609, Q611<br>2SC2591 (O or R) | Q614, Q616, Q618, Q620<br>2SB688 (R or O) | Q625 ~ Q628<br>1S2471G         | Q639 ~ Q641, Q647, Q648<br>1S1555  |                |



部品は、安全上重要な部品です。必ず指定されている部品番号の部品を使用してください。

変更することがありますが、ご了承ください。



# SCHEMATIC DIAGRAM

Q401, Q402  
2SK170(GR or BL)  
Q403, Q404  
2SJ746R or BL)  
Q405, Q406, Q411, Q412  
2SC2240(GR or BL)

Q407, Q408, Q409, Q410  
2SA970(GR or BL)  
Q413, Q414  
2SA872A(D or E)  
Q415, Q416  
2SC1775A(D or E)

Q417, Q418  
2SC2320(F)  
Q419, Q420  
2SC2591(Q or R)  
Q421, Q422  
2SA1111(Q or R)

Q423 ~ Q426  
1S1555  
Q427, Q428  
2SC2545(E)  
Q429, Q430  
2SA1063(E)

Q431, Q432  
2SC2320  
Q433, Q434  
2SA872A(D or E)  
Q435, Q436  
2SC1775A(D or E)  
Q437, Q438  
2SC2320

Q439, Q440  
2SC2545(E)  
Q441, Q442  
2SC2320  
Q443, Q444  
2SA872A(D or E)  
Q445, Q446  
2SC1775A(D or E)  
Q447, Q448  
2SC2320

Q449, Q450  
2SC2545(E)  
Q451, Q452  
2SC2320  
Q453, Q454  
2SA872A(D or E)  
Q455, Q456  
2SC1775A(D or E)  
Q457, Q458  
2SC2320

Q459, Q460  
2SC2545(E)  
Q461, Q462  
2SC2320  
Q463, Q464  
2SA872A(D or E)  
Q465, Q466  
2SC1775A(D or E)  
Q467, Q468  
2SC2320

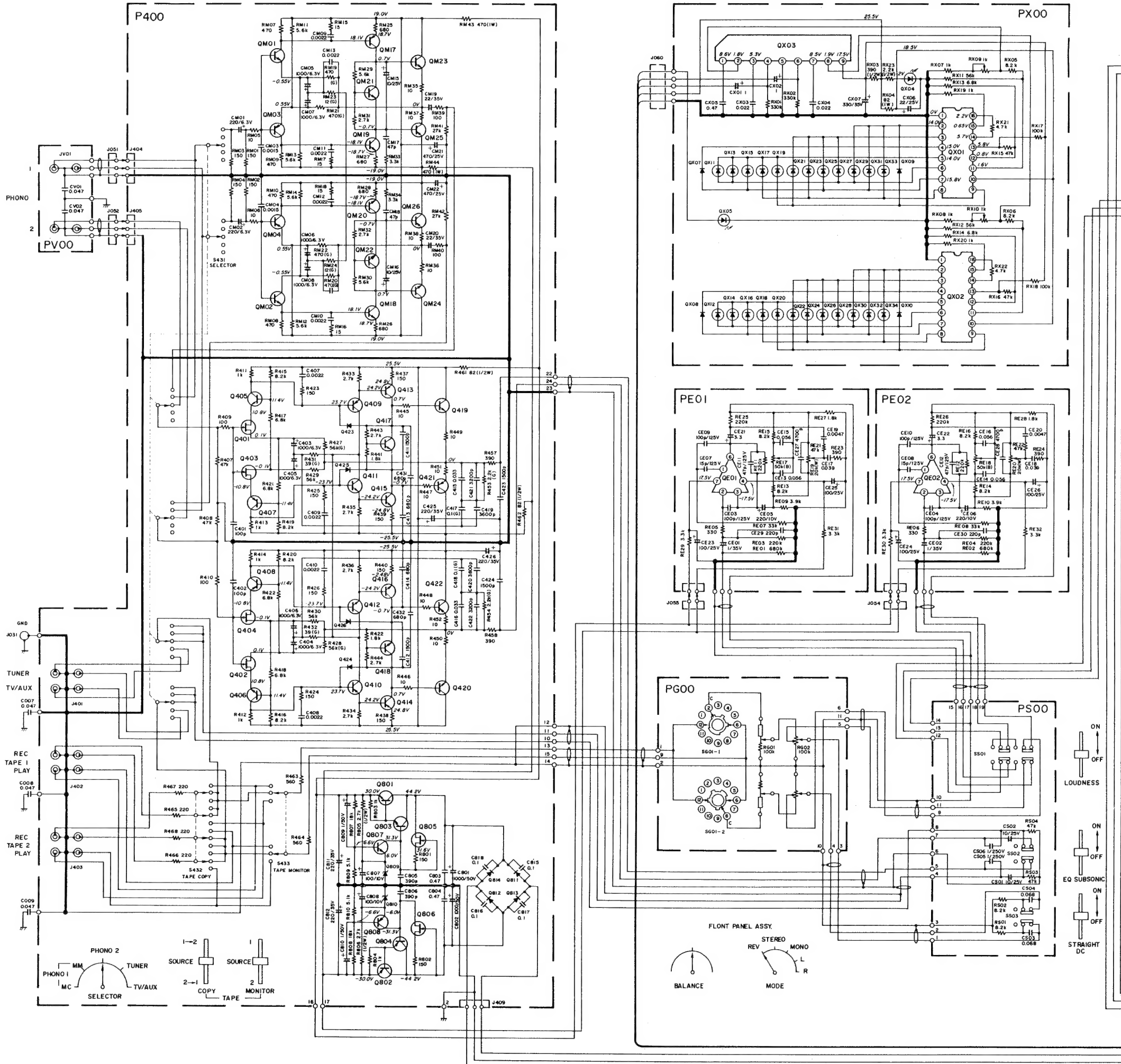
Q469, Q470  
2SC2545(E)  
Q471, Q472  
2SC2320  
Q473, Q474  
2SA872A(D or E)  
Q475, Q476  
2SC1775A(D or E)  
Q477, Q478  
2SC2320

Q479, Q480  
2SC2545(E)  
Q481, Q482  
2SC2320  
Q483, Q484  
2SA872A(D or E)  
Q485, Q486  
2SC1775A(D or E)  
Q487, Q488  
2SC2320

Q489, Q490  
2SC2545(E)  
Q491, Q492  
2SC2320  
Q493, Q494  
2SA872A(D or E)  
Q495, Q496  
2SC1775A(D or E)  
Q497, Q498  
2SC2320

Q499, Q500  
2SC2545(E)  
Q501, Q502  
2SC2320  
Q503, Q504  
2SA872A(D or E)  
Q505, Q506  
2SC1775A(D or E)  
Q507, Q508  
2SC2320

Q509, Q510  
2SC2545(E)  
Q511, Q512  
2SC2320  
Q513, Q514  
2SA872A(D or E)  
Q515, Q516  
2SC1775A(D or E)  
Q517, Q518  
2SC2320



Note on safety: The parts marked with  $\Delta$  are important parts on the safety. Please use the parts having the designated parts number without fail.

Components and wiring are subject to change for modification without notice.



Model Pm-5

|   |                                |                       |                        |                                      |                                |   |                                |                                    |                |
|---|--------------------------------|-----------------------|------------------------|--------------------------------------|--------------------------------|---|--------------------------------|------------------------------------|----------------|
| Q7, Q708, Q715, Q716<br>2240 (GR or BL) | Q717, Q718<br>25A1124 (R or S) | Q723, Q724<br>WZ150   | Q772<br>25A1110        | Q601, Q602<br>25C1568 (S)            | Q605, Q606<br>25C2632 (R or S) | Q610, Q612<br>25A1111 (Q or R)            | Q621, Q622<br>25C1815 (O or Y) | Q629 ~ Q632, Q642 ~ Q645<br>DS1350 | Q649<br>BZ-240 |
| Q9, Q710, Q713, Q714<br>970 (GR or BL)  | R719, R720<br>25C2632 (R or S) | Q725 ~ Q730<br>151555 | Q773, Q775<br>25C1775A | Q603, Q604, Q623<br>25A1015 (O or Y) | Q607, Q608<br>25A1124 (R or S) | Q613, Q615, Q617, Q619<br>25D718 (R or O) | Q624<br>TA7317P                | Q633 ~ Q636<br>W06C                |                |
|   | Q721, Q722<br>AN6552 (4558)    | Q771<br>25C2590       | Q774<br>25A872A        |                                      | Q609, Q611<br>25C2591 (Q or R) | Q614, Q616, Q618, Q620<br>25B668 (R or O) | Q625 ~ Q628<br>152471G         | Q639 ~ Q641, Q647, Q648<br>151555  |                |

